

Total No. of Printed Pages-3]

Roll No. _____

CC(M)
AGRICULTURE
(OPTIONAL)
PAPER - I
[07]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

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- vi) *No blank page be left in between answer to various questions.*

SECTION - A

1. Answer the following in about 150 words each. (5×10=50)
- a) Discuss the current scenario of pulse production in India and the strategies to enhance their productivity. (10)
 - b) What is Integrated Farming System and its components? Discuss its usefulness in doubling farmer's income. (10)
 - c) Discuss the expectations and disappointments from the COP 26 in Glasgow. (10)
 - d) Discuss about herbicide free conservation agriculture. (10)
 - e) Describe the role of KVKs in enhancing farmer's income and livelihood security. (10)
- 2.
- a) What is "Global Warming"? Justify that agriculture both contributes to climate change and is affected by climate change. Discuss the strategies to lower the emission of greenhouse gases from agriculture. (20)
 - b) Enlist the methods of rice establishment. Discuss the effect of Puddling on soil properties. Explain the system of rice intensification. (15)
 - c) Why is winter maize productivity often greater than 'Kharif' maize productivity? (15)
- 3.
- a) Discuss the role of artificial intelligence and information & communication technology in water, nutrient and weed management in Agriculture. (20)
 - b) What is crop diversification and its role in conserving our natural base and doubling farmer's income? Enlist important cropping systems of north India. (15)
 - c) What are the major weeds (with botanical names) found in rice field? Discuss integrated weed management for rice. (15)
- 4.
- a) Explain the terms - "Agro-climatic Zone and Agro-ecological Region". Enlist different agro-climatic zones of India given by ICAR. Discuss the strategies to boost crop productivity in North-Western Himalayan Zone. (20)
 - b) Write the principles and components of organic and natural farming. Discuss their role in sustaining agricultural production. (15)
 - c) Explain the role of training programme for skill development. Why is evaluation an essential part of any extension training programme? (15)

SECTION - B

5. Answer the following in about 150 words each. (5×10=50)
- a) What is integrated watershed management? Describe its prospects and limitations. (10)
 - b) Enlist the types and methods of irrigation. Elaborate two most efficient irrigation systems for water deficit areas. (10)
 - c) Explain integrated plant nutrient management system (IPNS). Discuss the role of biomass recycling and bio fertilizers in IPNS. (10)
 - d) Discuss the role of carbon sequestration in mitigating climate change. Why is conservation of forest flora and fauna crucial? (10)
 - e) Explain the optimization of resource use for income generation in integrated farming systems. (10)
6. a) What are problematic soils? Discuss the amelioration of acid and sodic soils. (20)
- b) Discuss the strategies for improving soil and water productivity of rainfed areas. (15)
- c) Why is phosphorus use efficiency generally low? Discuss phosphorus management strategies in acid and alkaline soils. (15)
7. a) Discuss the strategies for efficient nitrogen management under aerobic and anaerobic soil conditions. (20)
- b) Explain forestry, agroforestry and social forestry. How can agroforestry be helpful in mitigating the present day problems of Indian agriculture? Write about value addition in agroforestry. (15)
- c) Discuss different forest propagation methods. What are major forest products in India and their uses? (15)
8. a) Discuss the importance of farm management. What are the economic principles of farm management. (20)
- b) Discuss the irrigation scenario of India and explain current initiatives for increasing area under irrigation in India. (15)
- c) Discuss the role of market intelligence for marketing of agricultural commodities. (15)
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CC(M)
ANIMAL HUSBANDRY AND VETERINARY SCIENCE
(OPTIONAL)
PAPER - I
[09]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION - A

1.
 - a) Explain the microbial digestion of nutrients in ruminant animals. (10)
 - b) Describe breeding soundness evaluation in bulls. (10)
 - c) Explain the role of vitamins and minerals in erythropoiesis. (10)
 - d) Name three game changing technologies in dairy sector. What are the steps in Transfer of Technology? Explain the significance of feedback in Transfer of Technology. (10)
 - e) Explain mechanism and control of secretion in endocrine glands. (10)

2.
 - a) Discuss the effect of stress on production and reproduction in farm animals. (20)
 - b) Differentiate the following: (3×5=15)
 - i) Gross energy and Metabolisable energy
 - ii) Gene frequency and Genotypic frequency
 - iii) Inbreeding and Cross breeding
 - c) Describe recombinant gene transfer technique for growth manipulation. (15)

3.
 - a) Discuss the factors affecting digestibility of nutrients in the animals. (20)
 - b) Describe factors affecting semen production and quality in bulls. Enumerate and describe the steps involved in semen collection and AI in swine. (15)
 - c) How will you formulate balanced and economical ration for the goat. (15)

4.
 - a) Explain growth regulating hormones and their effect on bones and protein metabolism. (20)
 - b) Explain the following: (3×5=15)
 - i. Mass contact methods to educate the farmers.
 - ii. Construction of selection indices in animal breeding.
 - iii. Humoral control of ventilation.
 - c) What is bypass fat? Explain its advantage in dairy animals. Explain your strategies to manage the livestock under flood condition. (15)

SECTION - B

5. a) Explain the principle and procedure of sperm sorting technique. (10)
- b) Significance of blood groups in animals. What are the different stages of clot formation. (10)
- c) What opportunities do you see in Goat farming in India? What points should be kept in mind while starting the same? (10)
- d) Explain the different abnormalities of RBC concentration. (10)
- e) Importance of colostrum feeding in animals. (10)
6. a) Describe renal mechanism of urine formation and factors affecting glomerular filtration rate. (20)
- b) Write short note on the significance of biochemical tests in disease diagnosis. (15)
- c) Explain the process of Lactogenesis and milk ejection. (15)
7. a) Enlist the hormones involved during pregnancy and parturition and explain their roles. (20)
- b) Tabulate the antinutritional factors present in common feed stuffs along with their effect. (15)
- c) Brief note on Rashtriya Gokul Mission and National Animal Disease Control Programme. (15)
8. a) Explain the composition and functions of blood in mammals. (20)
- b) Describe the etiology and therapeutic management of anestrus in buffaloes. (15)
- c) Feeding schedule of calf from birth to 6 months of age. (15)
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CC(M)
ANTHROPOLOGY
(OPTIONAL)
PAPER - I

[11]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION - A

1. Write notes on the following in about 150 words each. (5×10=50)
 - a) Anthropology and Medical Sciences (10)
 - b) Matrifocal Family (10)
 - c) Stateless Society (10)
 - d) Alliance Theory (10)
 - e) Social Institution (10)

2.
 - a) Examine importance of Cultural Relativism in the context of Global peace. (20)
 - b) Critically discuss the problem in anthropological definition of marriage citing Indian examples. (15)
 - c) Discuss different methods of analyzing qualitative data in anthropology. (15)

3.
 - a) Critically examine the contribution of Victor Turner in development of theory in social anthropology. (20)
 - b) What do you mean by the term 'Stone Age Economics'? Describe modes of economic exchange among simple societies. (15)
 - c) Discuss the subject matter and scope of Linguistic Anthropology. (15)

4.
 - a) Discuss the impact of urbanization and industrialization on the structure and function of family citing Indian examples. (20)
 - b) What is New Ethnography? Discuss the contribution of Stephen A. Tyler and Harold C. Conklin in development of this field. (15)
 - c) Give anthropological definition of Religion. Discuss the role of religious functionaries in tribal societies. (15)

SECTION - B

5. Write notes on the following in about 150 words each. (5×10=50)
- a) Karyotype Analysis (10)
 - b) Rhodesian Man (10)
 - c) Epidemiological Anthropology (10)
 - d) Genome-Wide Association Study (GWAS) (10)
 - e) Hardy-Weinberg Law (10)
6. a) Write a note on Absolute Dating Method used in Prehistoric Archaeology. (20)
- b) Write a note on the characteristics of Primate Behaviour studied by ethologists. (15)
- c) Discuss recent trends in the use of Recombinant DNA technology for the fields of disease and medicine. (15)
7. a) Differentiate between Growth and Development. Discuss stages of Growth. (20)
- b) Write a note on the theories of Organic Evolution with criticism. (15)
- c) Critically examine racism and its impact on human society. (15)
8. a) Examine anatomical changes occurring in the human due to erect posture. (20)
- b) Describe prominent chromosomal aberrations found among human beings. (15)
- c) Discuss biological factors influencing fecundity, fertility, natality and mortality. (15)
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CC(M)
BOTANY
(OPTIONAL)
PAPER - I
[13]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION -A

1. (a) Mode of multiplication by Transduction method. (10)
(b) Ecological and Economic Importance of Bryophytes. (10)
(c) Tetrapolar Heterothallism. (10)
(d) Salient features of Gnetales. (10)
(e) Define Numerical Taxonomy and mention its Principles. (10)
2. (a) Explain the role of plant quarantine in disease forecasting. Give suitable examples. (20)
(b) Why natural system of classification of Angiosperm is so popular, how this system is different from phylogenetic system of classification. (15)
(c) Give Salient features of Cycadales. (15)
3. (a) Describe the symptoms, causal organisms and control measures of white rust of crucifers and red rot of sugarcane. (20)
(b) Trace the evolution of hexaploid wheat. (15)
(c) Describe Thallus organization in Algae with suitable techniques. (15)
4. (a) Explain Stelar evolution in pteridophytes with suitable diagrams. (15)
(b) Define Endosperm, how its development takes place explain with suitable diagram. (15)
(c) Explain protoplast culture. How it is different from tissue culture. (20)

SECTION - B

Write short notes in about 150 words.

5. (a) Orchids and their economic importance. (10)
(b) Somaclonal variation and its applications. (10)
(c) Fungal Toxins. (10)
(d) Ecological and economic importance of Forests. (10)
(e) Economic importance of Algae. (10)
6. (a) Discuss the symptoms, causal organism and disease cycle of any two important diseases caused by nematodes in plants. (20)
(b) Draw well labelled diagrams of two semi-autonomous organelles in Eukaryotic cells and mention their functions. (15)
(c) How embryo can be rescued, mention its applications also. (15)
7. (a) Explain with schematic diagrams, various types of life cycles in Algae with suitable examples. (20)
(b) Explain Structural variations in chromosomes and its significance. (15)
(c) Define Ecosystem and explain how movement of energy takes place in various trophic levels of the Ecosystem. (15)
8. (a) Give general characteristics of Bryophytes. Enlist the resemblances and differences between bryophytes and pteridophytes. (20)
(b) Define Basal Angiosperms and explain the Herbaceous theory of origin of Angiosperms. (15)
(c) Explain the Importance of Ethnobotany in Indian Context. (15)

CC(M)
CHEMISTRY
(OPTIONAL)
PAPER - I

(15)

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SECTION -A

1.
 - a) Write the time-independent Schrodinger wave equation for a particle of mass m in one dimension and explain the various term involved in it. What are the criteria for a wave function to become a solution to this equation? (10)
 - b) Define radial distribution function. Draw radial probability distribution curves for 3s 3p and 3d atomic orbital and explain the order of penetration and screening effect of 3s 3p and 3d electrons. (10)
 - c) Explain the importance of Born Haber's Cycle to find out the Proton affinities of the Bronsted bases by taking a suitable example. (10)
 - d) Define bond length and bond strength. How is the percentage of ionic character in covalent bonds related to the difference in electronegativities of constituent elements? How is the dipole moment of a molecule related to the percentage of ionic character? Illustrate your answer with respect to the HF molecule. (10)
 - e)
 - i) Draw the structure of CaF_2 .
 - ii) What is the radius ratio rule? Explain its limitations. (10)
2.
 - a) The second-order reaction $\text{X} + \text{Y} \rightarrow \text{Products}$ is having a rate constant of $35.1 \text{ litres mol}^{-1} \text{ minute}^{-1}$. A solution is made of 0.004 molar in X and 0.005 molar in Y. How long will it take 80% of X to react? (20)
 - b) What is meant by Electrochemical Series? Using the data given in the series explain why. (15)
 - i) Cu(I) sulfate does not exist in the solution.
 - ii) Neither Cu^+ nor Co^{3+} is stable in an aqueous solution.
 - iii) Zinc reacts with H_2SO_4 to give H_2 but silver does not.
 - c) Calculate the number of phases, components, and degree of freedom in the following systems:
 - i) A mixture of nitrogen and oxygen gases contained in a vessel.
 - ii) Rhombic sulphur in equilibrium with monoclinic sulphur.
 - iii) Solid carbon is in equilibrium with gaseous CO , CO_2 and O_2 at 100 C. (15)

3. a) i) Calculate the mean ionic activity coefficient of 0.1 molal CaCl_2 in water at 25 C. The value of A in Debye Huckel's equation is 0.509. (10)
- ii) From the two Laws of Thermodynamics, write down Maxwell's relations. (10)
- b) Discuss the X-ray diffraction studies on sodium chloride crystals and arrive at the crystal lattice structure of NaCl. Compare this with the crystal lattice structures of KCl and CsCl. (15)
- c) With the help of the Jablonski Diagram explain the various types of photochemical transitions. (15)
4. a) Account for the following: (5×4=20)
- i) Joule Thomson Coefficient for an ideal gas is zero.
- ii) Hydrogen gas at high pressure on expansion at room temperature undergoes an increase in temperature.
- iii) Carbon dioxide initially at 200°C can't be converted into a liquid by merely increasing the pressure.
- iv) ΔG is better criterion for spontaneity of a reaction than ΔH
- b) Draw the molecular orbital diagrams of CO and O_2 and predict their bond orders & magnetic properties. (15)
- c) Give an account of Debye-Huckel's theory of strong electrolytes. Explain the asymmetry effect and electrophoretic effect. (15)

SECTION - B

5. a) Explain the following: (10)
- i) Ce^{4+} acts as an oxidizing agent whereas Eu^{2+} is a reducing agent.
- ii) High spin octahedral complexes of Mn^{2+} are colourless.
- iii) MnO_4^- ion exhibits intense purple colour whereas ReO_4^- is colourless

- b) i) Solutions of the complexes $[\text{CoL}_6]^{3+}$ and $[\text{CoL}'_6]^{3+}$ where L and L' are two different monodentate ligands, are of pink and yellow colors respectively, which would be expected to have a higher value of Δ ?
- ii) Draw the structures of the stereoisomers of $\text{trans-}[\text{CoCl}_2(\text{trien})]^+$, (trien=triethylenetetramine).

(10)

- c) Write the electronic configurations of the following complex ions on the basis of crystal field theory:

(10)

- i) $[\text{Cr}(\text{CN})_6]^{4-}$
- ii) $[\text{RhF}_6]^{3-}$
- iii) $[\text{NiF}_6]^{2-}$
- iv) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$
- v) $[\text{Co}(\text{NH}_3)_6]^{2+}$

- d) Write the IUPAC name of the following:

(10)

- i) $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2][\text{PtCl}_4]$
- ii) $[\text{Cr}(\text{NH}_3)_5(\text{NCS})][\text{ZnCl}_4]$
- iii) $\text{K}_2[\text{Fe}(\text{CN})_5(\text{NO})] \cdot 2\text{H}_2\text{O}$
- iv) $\text{K}_2[\text{OsNCl}_5]$

- e) Complete and balance the following reactions:

(10)

- i) $\text{N}_3\text{P}_3\text{Cl}_6 + \text{NaF} \rightarrow$
- ii) $\text{NOF} + \text{ClF} \rightarrow$
- iii) $\text{SbF}_5 + \text{BrF}_3 \rightarrow$
- iv) $\text{XeF}_6 + \text{RbF} \rightarrow$
- v) $\text{XeF}_6 + \text{SiO}_2 \rightarrow$

6. a) Explain the following: (20)

i) IF_7 is known whereas ICl_7 is not known.

ii) ICl is more reactive than I_2

iii) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ ion acts as Bronsted acid.

b) i) What is the general formula of single-chain silicates, write the repeating unit? With the help of structure explain how many oxygen atoms are shared by each SiO_4 unit.

ii) Calculate the magnetic moment for the complexes of Pr^{3+} ion ($Z=59$).

iii) What is Lanthanide contraction? Although the lanthanide contraction is apparent from the atomic radii, it is best explained by the ionic radii of +3 ions. Explain. (15)

c) i) The basic character of Lanthanide hydroxides decreases on going from $\text{La}(\text{OH})_3$ to $\text{Lu}(\text{OH})_3$. Explain.

ii) $\text{Lu}(\text{OH})_3$ is soluble in NaOH solution whereas $\text{La}(\text{OH})_3$ is not. Explain.

iii) Give the Chemical formula of pentammine(thiocyanato-*k* N) Cobalt (III) sulfate. (15)

7. a) Draw all geometrical and optical isomers of the following complexes:

i) $[\text{Co}(\text{NH}_3)_3(\text{Py})_2\text{Cl}_2]^+$

ii) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$

iii) $[\text{Co}(\text{en})_3]^{3+}$ (20)

b) Explain the following:

i) The sizes of Zr and Hf are similar.

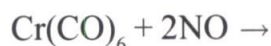
ii) $[\text{PtF}_6]$ is stable whereas $[\text{NiF}_6]$ does not exist.

iii) Actinides have a greater tendency to form complexes than Lanthanides. (15)

- c) i) Explain Lability and inertness on the basis of Crystal Field Theory with examples.
- ii) $[\text{NiCl}_4]^{2-}$ is paramagnetic whereas $[\text{PdCl}_4]^{2-}$ and $[\text{PtCl}_4]^{2-}$ are diamagnetic in nature. Explain.
- iii) A complex of Ni(II), $[\text{NiCl}_2(\text{PPh}_3)_2]$ is paramagnetic. The analogous Pd(II) complex is diamagnetic. Draw the structures of the isomers of Ni(II) and Pd(II) complex. (15)

8. a) Explain the following:

- i) Write the Product of the following reaction:



- ii) Explain the Denticity and Hapticity with suitable examples.
- iii) Among the following:



Select the chain forming, branching and terminating agents respectively in the synthesis of polydimethylsiloxane. (20)

- b) i) Write the Product of the following reaction:



- ii) Draw the structure and calculate the total number of M-M bonds and M-M bonds per metal in $\text{Ir}_4(\text{CO})_{12}$. (15)

- c) i) What are the functions of cytochromes and ferredoxins?
- ii) What is meant by the active transport in the Na/K pump?
- iii) Write the chemical formula of dichloride bis(methanamine) Copper(II) and triamine tri (nitrito-*k* N) Cobalt (II). (15)
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CC(M)
CIVIL ENGINEERING
(OPTIONAL)
PAPER - I

Time Allowed - Three Hours

[17]

Maximum Marks-250

INSTRUCTIONS

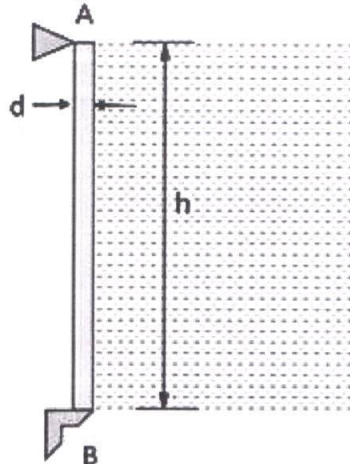
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- iv) *Diagrams/Figures, may be drawn wherever required in the space provided.*
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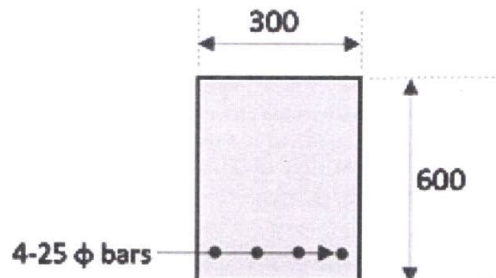
SECTION - A

1. Answer the following in about 150 words each :

- a) The figure shows a simplified schematic of a water supporting structure AB. The structure may be assumed to be simply supported. The height of AB is $h = 3$ m and its thickness $d = 150$ mm. Assuming specific weight of water as 9.81 kN/m³, find the maximum bending stress generated in AB due to the load exerted by water. You may consider the structure AB to have unit dimension perpendicular to the plane of the figure. (10)



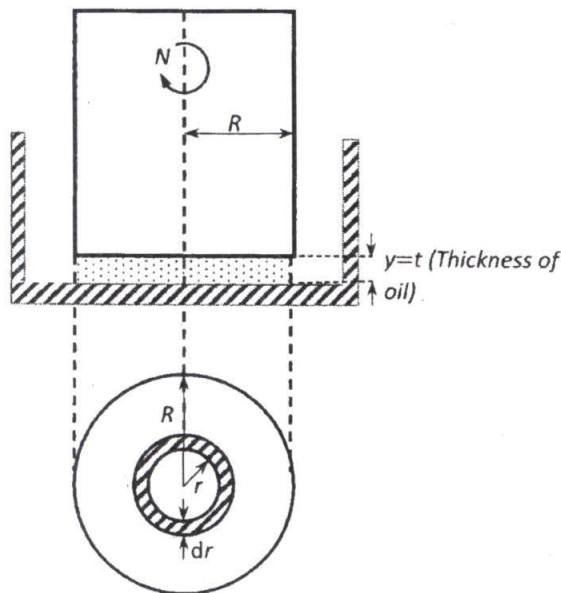
- b) A 7 m high retaining wall is to support a soil with unit weight $\gamma = 18$ kN/m³, friction angle $\phi' = 28^\circ$ and cohesion $c' = 15$ kPa. If the tensile crack occurs in the soil behind the wall, (10)
- Determine the Rankine active force per unit length of the wall
 - Determine the line of action of the resultant force.
- c) Show that the tension steel bars do not yield at the ultimate limit state of flexural collapse (as per IS456:2000) of the beam section in the figure. Steel bars are of Fe 415 grade, and concrete is of M20. The clear cover to the reinforcement is 30 mm. Dimensions are given in mm. (10)



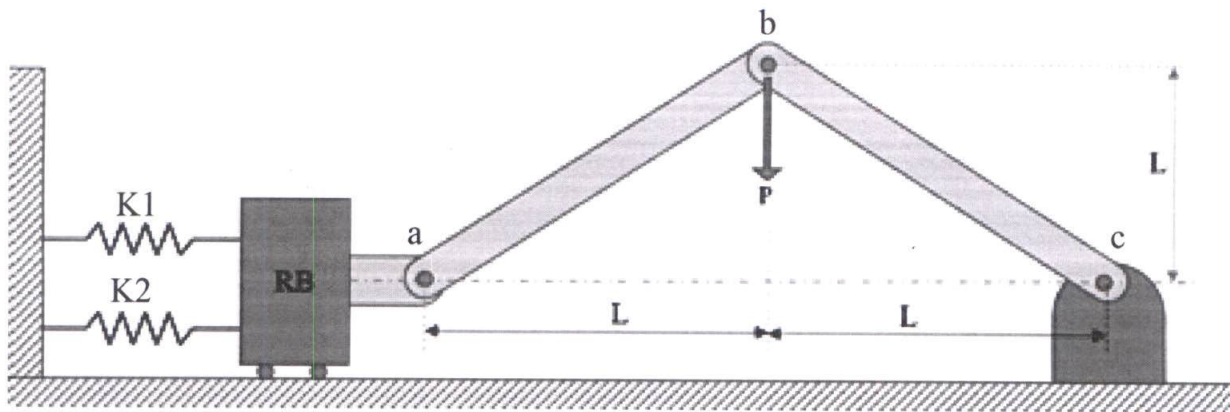
Find out the minimum amount of compression steel that may be introduced in the section with an effective cover of 40 mm to ensure yielding of the tension steel at the ultimate limit state of collapse. Use the following data and linear interpolation for the design stress in steel at different strains.

Strain	0.0028	0.0030	0.0035	0.0038
Stress	$0.840 f_y$	$0.845 f_y$	$0.860 f_y$	$0.870 f_y$

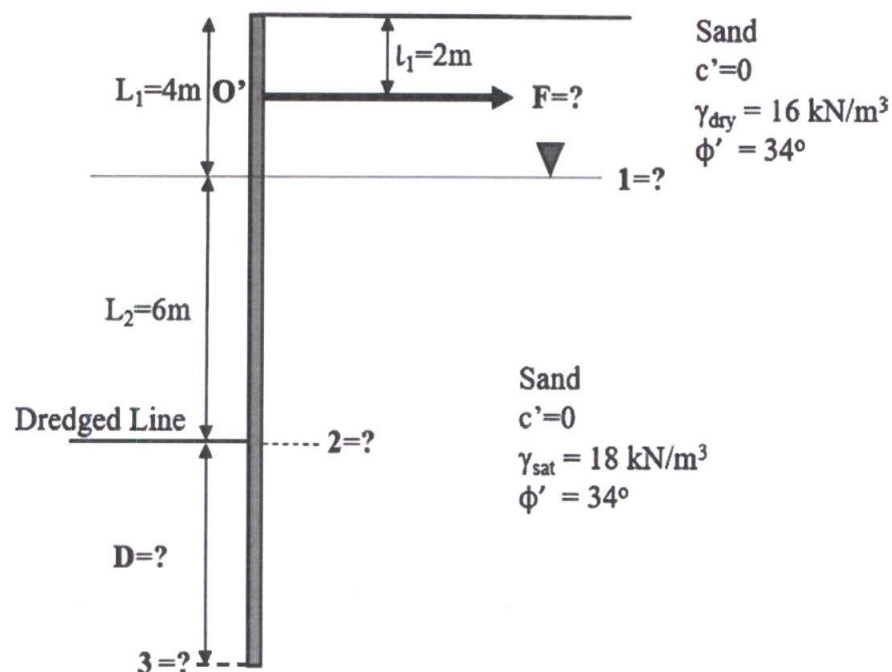
- d) Define the following : (10)
- Diffuse double layer
 - Non-Newtonian fluid
 - Strain Energy
 - Turbulent flow
 - Permeability
- e) Determine an expression for power lost due to viscosity of lubricating oil as shown in fig below. (10)



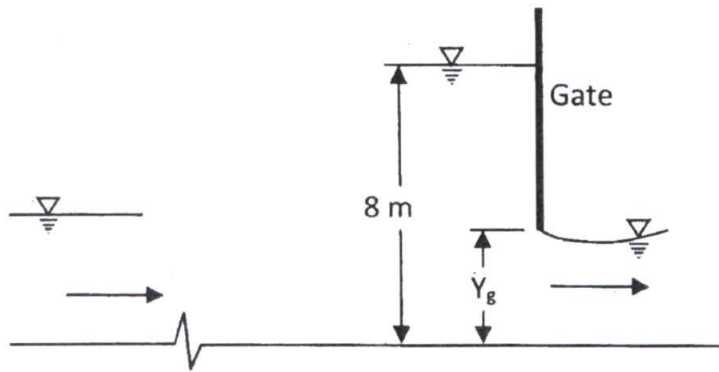
2. a) The system shown in the figure below is in equilibrium under the application of force P at node b . In this system, the only deformable components are the two springs attached to a movable rigid block RB at one end and the other end being fixed with the wall. The springs have axial stiffnesses K_1 and K_2 . The three pin joints are denoted by a , b and c . The rigid block will slide back to a different location if the load P is slowly removed. (20)
- Find out the amount of displacement the rigid block will undergo from its current location when the load is completely removed.
 - Calculate the value of total reaction force, if any, at the roller support of the rigid block RB .



- b) The velocity field in a fluid flow is $\vec{V} = (x^2 + y^2)\hat{i} + (y^2 - z^2)\hat{j} + (2xz - 2yz)\hat{k}$. Compute the rotator vector and the acceleration at point (1,2,3). (15)
- c) An anchored sheet-pile bulkhead is shown in Figure below. The soil is 'sand' of cohesion $c' = 0$, friction angle $\phi' = 34^\circ$, $\gamma_{\text{dry}} = 16 \text{ kN/m}^3$ and $\gamma_{\text{sat}} = 18 \text{ kN/m}^3$. The ground water table is at 4m below the ground surface. Assuming 'free- earth support method' and unit weight of water as 10 kN/m^3 , (15)
- Draw the net pressure distribution diagram showing the values of pressures at level 1, 2 and 3 (as shown in Figure).
 - Determine the theoretical value of the depth of embedment, D .
 - Calculate the anchor force per unit length, F .

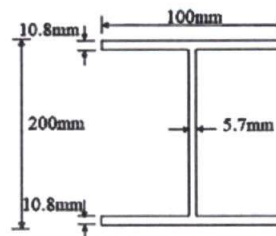
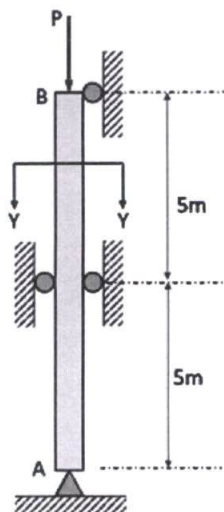


3. a) Water in a wide mountainous river is ponded up to depth of 8 m by a sluice gate operation as shown in the Figure. The Manning's roughness coefficient n is 0.02, the longitudinal slope S_0 is 0.01 and the discharge in the river is $6 \text{ m}^3/\text{s}/\text{m}$. (20)



Perform the following tasks:

- Compute the necessary gate opening, Y_g to pass the discharge through the gate. Consider the coefficient of contraction C_c as 0.6. Neglect the head loss and assuming the energy correction factors both upstream and downstream of the gate as 1.
 - Determine the nature of the gradually varied flow profile created upstream of the gate due to gate operation. Sketch the gradually varied profile clearly mentioning the its nomenclature and mark the control section.
 - Using Direct Step Method, compute the distance upstream of the gate at which hydraulic jump forms due to gate operation. Use one direct step.
 - Compute the head loss in the hydraulic jump
(Assume that far upstream of the gate, flow depth is equal to normal depth y_n . Take gravitational acceleration as 10 m/s^2)
- b) A slender steel column (ISMB 200 section) of length $L=10\text{m}$ has a hinge support at A and a roller support at end B. The column is restrained laterally in the plane of the paper at the midpoint as depicted in the figure. If the column can buckle in either of its principal planes, find the value of the maximum allowable compressive load P that can be applied to the column given that the value of $E=200 \text{ GPa}$. (15)

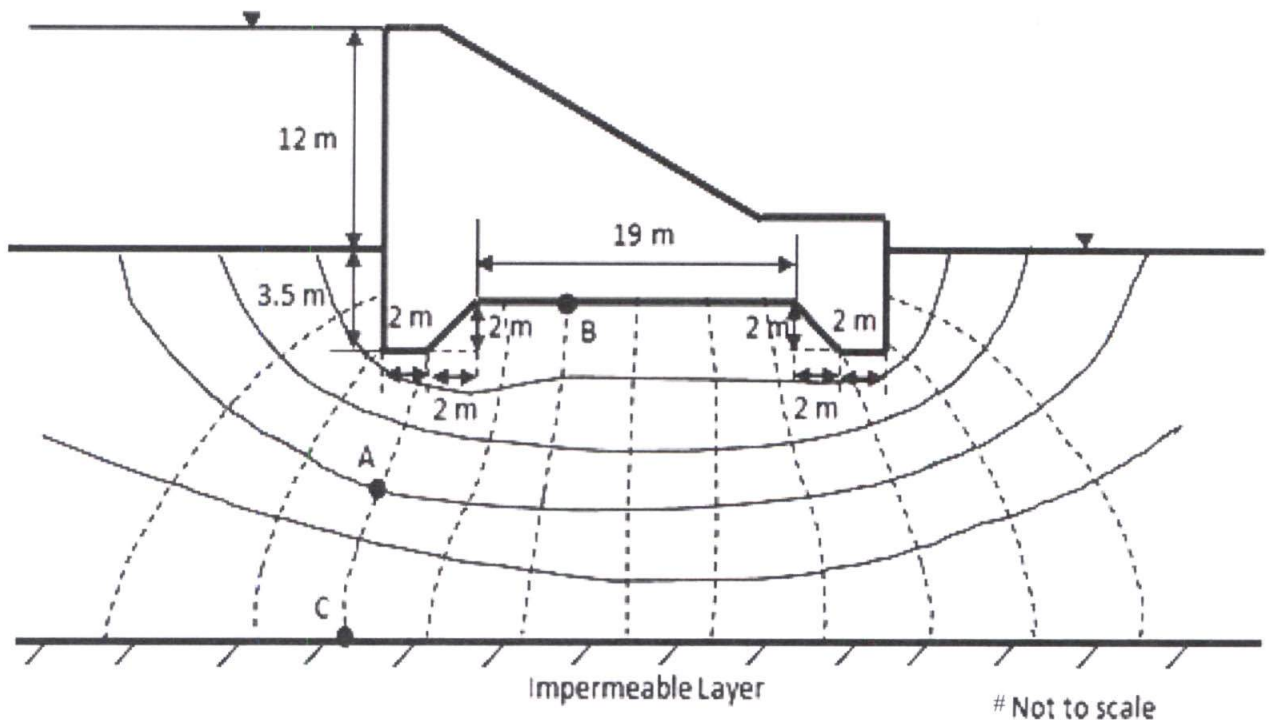


- c) A consolidated drained (CD) test was performed on a soil sample at a confining cell pressure of 150 kPa. The effective deviatoric stress is increased to 150 kPa. If the shear strength parameters of the soil were determined as $c'=20$ kPa, $\phi'=30^\circ$, check if the condition of failure is satisfied or not? (15)

- How much should the value of σ_1' be increased to induce failure, if σ_3' is kept constant?
- How much should the value of σ_3' be decreased to induce failure, if σ_1' is kept constant?
- If σ_1' is increased and σ_3' is decreased by the same amount, what will be the values of effective principal stresses at the time of failure?

4. a) Consider the flow net under a dam as shown below : (20)

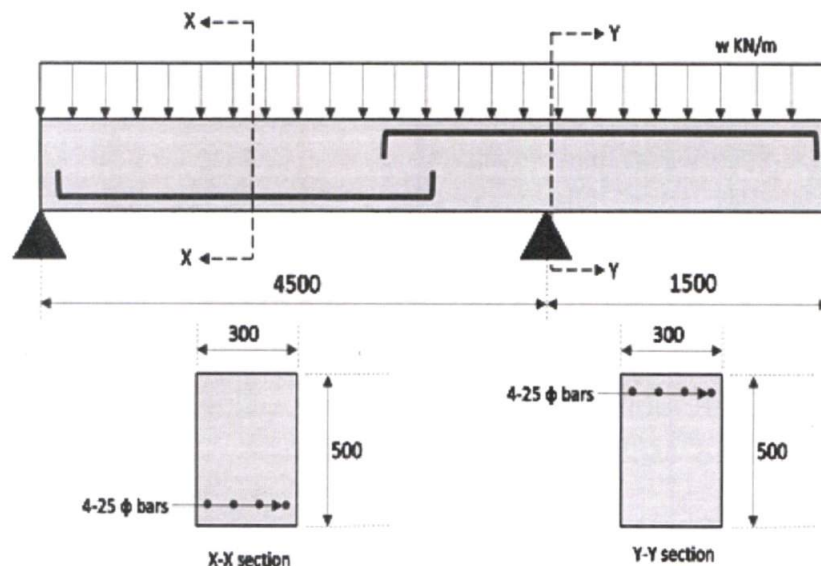
- Determine how high the water would rise in the piezometers installed at points A, B and C.
- If the coefficient of permeability is 0.02 mm/sec, determine the seepage loss of the dam in $\text{m}^3/\text{day-m}$.
- Determine the hydraulic uplifting force under the dam.



- b) The following figure shows an RC beam with all the necessary dimensions (in mm) and support conditions. The beam carries a uniformly distributed load of intensity w kN/m in addition to its self-weight. The beam sections throughout are assumed to be singly-reinforced. Tensile reinforcements are as shown in the figure. See the two typical cross-sections for details of the reinforcements. While there are stirrups and others rebars to hold them in place, they are not relevant for the question here and thus not shown in the figure. The grade of steel used is Fe 415, and that of concrete is M20. The effective cover to the reinforcement should be considered as 45 mm. Use modular ratio $m = 13.33$. (15)

Answer the following questions.

- Compute the cracking moments of the two sections shown in the figure.
- Where will the first flexural crack appear in the beam? Mark the location in a schematic diagram.
- At what intensity of load (w) will this crack appear?



- c) A pipeline having 60 cm diameter carries oil at a rate of 1000 lps. The pipe is connected to a pipe bend to change the direction of flow 60° from the horizontal. The pressure at the inlet of the pipe bend is 300 kPa. The outlet diameter of pipe bend is 30 cm. Take specific gravity of fluid as 0.8. (15)

Determine

- The resultant force on pipe bend if oil is at rest.
- The total resultant force on pipe bend if oil flows.

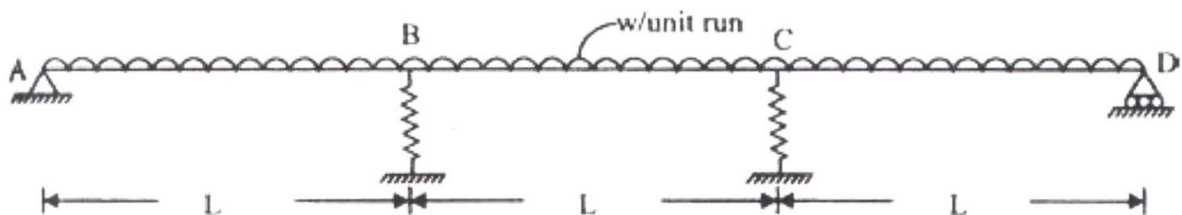
SECTION - B

5. a) Prove that the power developed in a water turbine can be expressed as

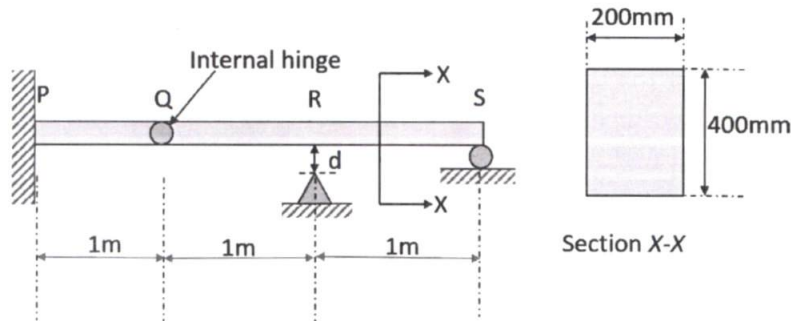
$$P = \rho D^5 N^3 f \left\{ \frac{D}{B}, \frac{\rho D^2 N}{\mu}, \frac{N_D}{\sqrt{gH}} \right\} \quad \text{where } D \text{ and } B \text{ are diameter and width of the}$$

runner, N is the speed in rpm, H is the operating head, and μ and ρ are, respectively, the coefficient of dynamic viscosity and mass density of the liquid. What are the assumptions used in deriving this functional relationship? (10)

- b) What are stress relaxation, stress corrosion and hydrogen embrittlement in high tensile strength steel used in prestressed concrete structures? What is loss of prestress? (10)
- c) Explain four different types of cross-sections defined in IS 800. Elaborate the moment-rotation characteristics of cross-section classes by providing neat sketches. (10)
- d) An infinite slope comprises of a soil with unit weight 19.5 kN/m^3 , cohesion, $c' = 0$ and $\phi' = 32^\circ$ underlain by a firm stratum. (10)
- i) Assuming that water table rises to the surface and the potential failure surface is parallel to the slope, determine the maximum slope angle to ensure a factor of safety of 1.5.
- ii) For the computed slope angle in part (i), what would be the factor of safety of the slope, if the water table is present at a great depth?
- e) A rectangular channel is 4 m wide and carries a discharge of $16 \text{ m}^3/\text{s}$ at a depth of 2 m. It is proposed to reduce the width of the channel to 3 m at a hydraulic structure. Assuming the transition to be horizontal and neglecting the head loss in the transition, determine the flow depth at the constricted section. (10)
6. a) Find the bending moments at the supports of a continuous beam (shown in the figure below) on elastic (spring) supports by the three moment theorem. The beam has a constant flexural rigidity EI , and the stiffness of the elastic supports is $K = 20EI/L^2$. (20)



- b) A concrete beam PQRS of span length 3m and rectangular cross-section of width $b=200$ mm and depth $h=400$ mm, is supported as shown in Figure 1. The part PQ is connected to the part QS through an internal hinge at Q. Faulty workmanship at the construction stage has led to an offset d between the beam and the hinge support at R. Assuming unit weight of concrete $= 25 \text{ kN/m}^3$, find the maximum allowable value of d such that the beam comes in contact with the hinge support under the effect of its self-weight. Consider elastic modulus of concrete as 25 GPa. (15)



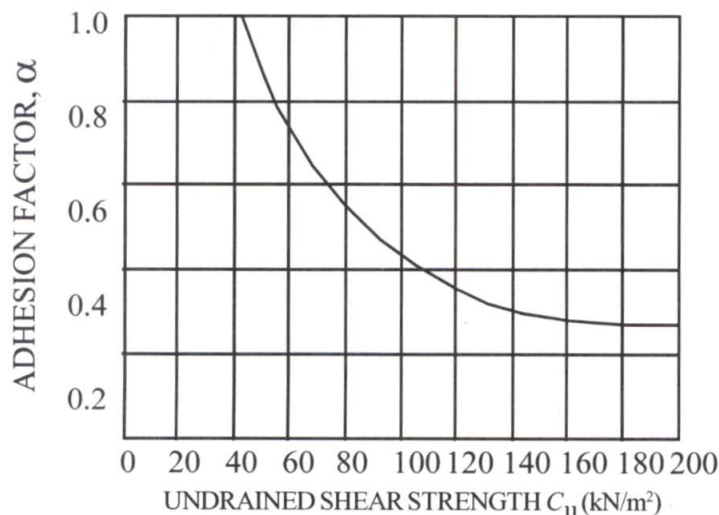
- c) A pile group consists of 9 driven piles in a 3×3 arrangement. Each pile is 0.4 m in diameter and are at a spacing of 1.2 m. The piles penetrate a medium clay soil of thickness 8 m and are embedded 2 m into a stiff clay layer. Calculate the group allowable load capacity for a factor of safety of 2. The groundwater level (GWL) is at 2 m below the surface but can rise to the surface due to seasonal changes.

The properties of soil layers are:

Medium clay: $c_u = 40 \text{ kPa}$, $\gamma_{\text{sat}} = 18 \text{ kN/m}^3$, OCR = 2

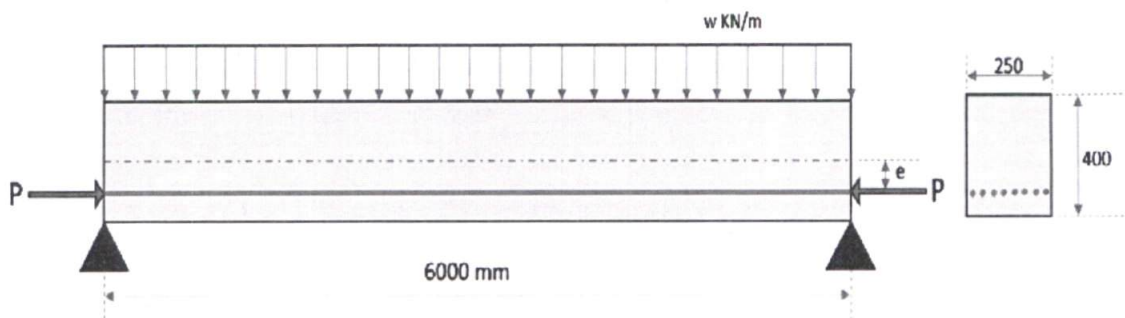
Stiff clay: $c_u = 90 \text{ kPa}$, $\gamma_{\text{sat}} = 18.5 \text{ kN/m}^3$, OCR = 5

(15)



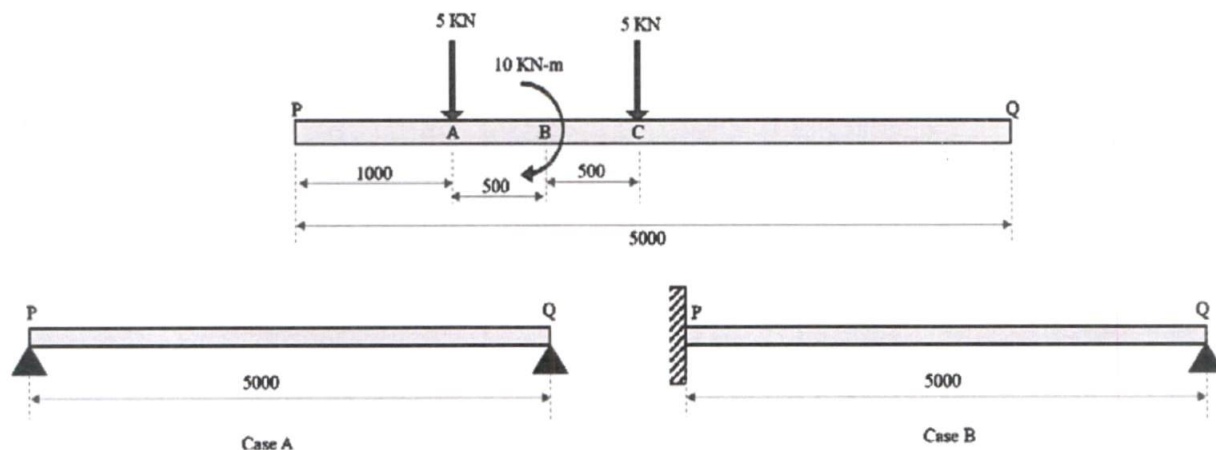
7. a) A pipeline having 90 cm diameter carries water at 300 lps. At the end of the pipe, a nozzle is connected having 75 mm diameter, which discharges water into the atmosphere. Determine the force experienced by the nozzle. Consider the water head at the inlet of the pipe as 4 m and the head loss in the pipe as 20 times of kinetic head. (20)
- b) A Rectangular concrete beam of width 250 mm and depth 400 mm is prestressed by means of 8 no of straight cables located at an eccentricity, e mm, from the centroidal axis of the beam. Each cable carries 20 kN prestressing load. The figure denotes the total prestressing force as P . The beam has an effective span of 6 m and is simply supported. It carries a uniformly distributed load (UDL) of intensity w kN/m, inclusive of its self-weight. Considering that the beam is in the uncracked linear elastic regime, answer the following questions.
- Find out the maximum value of eccentricity e , such that the beam does not develop tensile stress anywhere.
 - Considering the eccentricity of prestressing force to be what is calculated above, find the maximum value of the UDL intensity which will not induce tension in the beam.
 - Find the location of the thrust-line of the beam at the mid-span.

You need not transform the cross-sectional area using a modular ratio to answer the above questions. Use the gross cross-sectional area and its moments for your computations. (15)



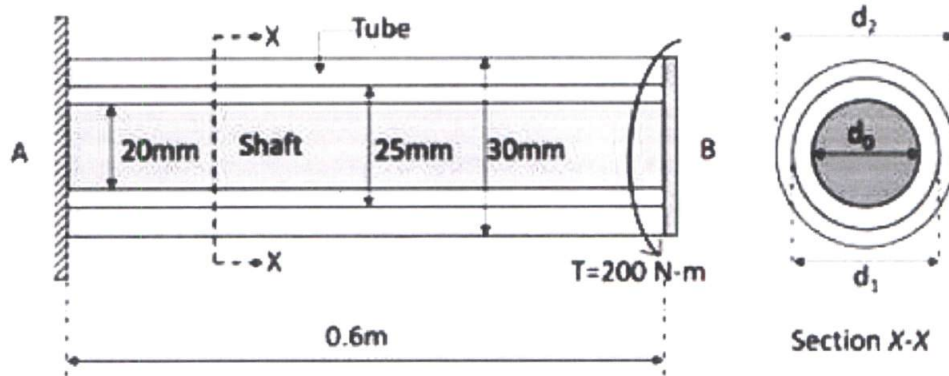
- c) The soil profile at a proposed site for new building consists of a layer of sand 10.5m thick, underlain by 3m thick lightly over-consolidated clay with over-consolidation ratio of 1.5. Below the clay layer, lies the coarse sand layer. The building shall impose a vertical stress of 140 kPa at the middle of the clay layer. The void ratio and specific gravity of the sand are 0.75 and 2.7, respectively. For clay, water content $w_c = 45\%$, coefficient of compression $C_c = 0.3$, coefficient of recompression $C_r = 0.05$, specific gravity $G_s = 2.65$. The groundwater table was observed at 3 m below ground level. Estimate the primary consolidation settlement of the clay. Assume unit weight of water as 10 kN/m³. (15)

8. a) A beam PQ is subjected to two concentrated loads and a moment shown in the following figure. Compute the resultant of this external force system and find its line of action. Let us consider two different cases. In Case A, the beam PQ has been assigned simple supports and in Case B, it is supported as a propped cantilever. You might need to calculate the support reactions when the beams are subjected to the load system shown. However, instead of the system of loads, if you subject the beams to the resultant force and compute the reactions in both cases, will you obtain the correct reactions? Show mathematically how you arrived at your response. (20)



- b) A 30 cm diameter and 3 km length pipeline connects two reservoirs with piezometric heads of 100 m and 80 m upstream and downstream, respectively. The friction factor is 0.04. Determine the rate of flow. If another pipe of 30 cm diameter is connected to the existing pipe in a parallel pattern on the lower 2 km length, determine the percentage of change in discharge. (15)
- c) A solid brass shaft AB having diameter $d_0 = 20$ mm is encased within a brass tube of inner diameter $d_1 = 25$ mm and outer diameter $d_2 = 30$ mm as shown in figure. The combined system of length $L = 0.6$ m is fixed at end A and is connected to a rigid plate at end B. If a twisting moment $T = 200$ N-m is applied at the rigid plate at B, determine. (15)
- a) The maximum shear stresses generated in the shaft and the tube respectively.

- b) The torsional stiffness of the combined system. Consider shear modulus of brass $G_b = 40 \text{ GPa}$.



CC(M)
COMMERCE AND ACCOUNTANCY
(OPTIONAL)
PAPER - I

[19]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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- vi) No blank page be left in between answer to various questions.*

SECTION - A

1. Write short notes on (in about 150 words). (5×10=50)
- a) Discuss the main purpose of Opportunity Cost. (10)
 - b) Critically analyse the role of Rating Agencies. (10)
 - c) What are the advantages and disadvantages of Internal Audit. (10)
 - d) What is the purpose of Ratio Analysis? (10)
 - e) Difference between Cost and Financial Accounting. (10)

2. a) Savitri Ltd. Offered 10,000 equity shares of Rs. 100 each for the subscription at a premium of Rs. 20 per share payable as follows:

On Application	Rs. 10.
On Allotment	Rs. 40 (including premium)
On first call	Rs. 20
On Second call	Rs. 30

And balance on final call.

The company received applications for 12,000 shares and 10,000 shares were allotted *pro-rata*.

Holders of 500 shares failed to pay the first call and after due notice, their shares were forfeited. The amounts payable on second call were paid in full except that a holder of 200 shares failed to pay.

250 of the 500 shares forfeited were reissued, credited Rs. 80 paid for Rs. 50 per share.

The final was met in full including the arrears of the second call.

Journalize the transactions including cash transactions in the books of the company. (20)

- b) Shree Ji owns a business. Following is his profit and loss A/c for the year ended on 31.3.2021.

	Rs.		Rs.
Establishment Charges	5,010	Gross Profit	51,270
Rent, Rates and taxes	3,000	Rent from Property	5,000
Sundry expense	7,050	Interest on Govt.	
Provision for bad debts	1,200	securities (Gross)	5,350
Household expenses	1,880		
Provision for Depreciation	6,400		
Loss on sale of motor car (used for private purpose)	1,800		
Interest on Bank Loan	1,380		
Insurance Premium (including life insurance of Rs. 1,790)	2,880		
Net Profit	31,020		
	61,620		61,620

Additional Information:

- Bad debts written off during the year - Rs. 650.
- Admissible depreciation as per income tax rules Rs. 1,600.
- The assessee is running his business in a rented property, half of which is used by him for his own residence. Rent of Rs. 2,400 in respect of entire house is included in rent, rates and taxes. The balance of Rs. 500 is on account of municipal tax paid for property given on rent.

Compute the Gross Total Income of Shree Ji for the Assessment Year 2020-21. (15)

- c) Differentiate the working capital requirement based on total cost basis and cash cost basis. (15)

3. a) From the following data, find out the Labour Turnover Rate by applying:

- i) Flux Method;
- ii) Replacement method;
- iii) Separation method.

No. of workers on the payroll:

At the beginning of the month 500

At the end of the month 600

During the month, 5 workers left, 20 persons were discharged and 75 workers were recruited. Of these, 10 workers were recruited in the vacancies of, while the rest were engaged for an expansion scheme. (20)

- b) What do you mean by valuation of share? Describe the circumstances under which need of valuation of share arises. (15)

- c) On 1st April 2019, Prule System Ltd. purchased machinery for Rs. 1,30,000 and on 30th September, 2020, it acquired additional machinery at a cost of Rs. 20,000. On 30th June, 2021, one of the original machine (purchased on 1st April, 2019) which had cost Rs. 5,000 was found to have become obsolete and was sold as scrap for Rs. 500. It was replaced on that date by a new machine costing Rs. 8,000. Depreciation is to be provided @ 15% p.a. on the written down value. Accounts are closed on 31st March each year. Show the Machinery Account for the first three years. (15)

4. a) The following figures were extracted from the books of Happy Industries Limited:

Equity Share Capital	Rs.
1,000 Equity Shares of Rs. 100 each Rs. 50 called up.	50,000
1,000 Equity Shares of Rs. 100 each Rs. 25 called up	25,000
1,000 Equity Shares of Rs. 100 each fully called up	1,00,000
Preference Share Capital	
9% Preference share of Rs. 100 each	3,00,000
Reserve and Surplus	
General Reserve	2,00,000
Profit and Loss	50,000
Total of the Balance Sheet	7,25,000

It is given that there are no fictitious assets in the balance sheet. On a fair valuation of all the assets of the company, it is found that they have an appreciation of Rs. 75,000.

The article of association provided that, in case of liquidation, the preference shareholders will have further claim to the extent of 10% of the surplus assets. Ascertain the value of each preference and equity share, assuming liquidation, Ignore expenses of winding up. (20)

- b) How will you decide the question of residence of an individual and a Hindu undivided family? Explain. (15)
- c) What are the different kinds of Budgets? Please explain briefly. (15)

SECTION - B

Write short note on:

- 5. a) Major Functions of IRDA (10)
- b) Recommendations of Narsimhan Committee 1991. (10)
- c) How are 'Funds from Operations' computed. (10)
- d) Marginal Cost. (10)
- e) FIFO Method. (10)

- 6. a) i) "Capital Expenditure decisions are by far the most important decision in the field of financial management." Elucidate. (10)
- ii) Material consumption of Azad manufactures was 100kg. @ Rs. 2.25 per kg. in a cost period : (10)

Opening stock was 100 kg. @ Rs. 2.25 per kg.

Purchases made 500 kg. @ Rs. 2.15 per kg.

Consumption 110 kg.

Calculate :

- a) Usage
- b) Price variance
- a) When variance is calculated at point of purchase
- b) When variance is calculated at point of issue on FIFO basis.
- c) When variance is calculated at point of issue on LIFO basis.
- b) What do you mean by Bills of Exchange? How it is different from Promissory note? Also explain features of primary and secondary stock market. (15)
- c) Enumerate at least five items of income which can be included under the head 'Income from Other Sources'? (15)

7. a) The following is the capital structure of a company.

	Rs.
Equity shares of Rs. 100 each	20,00,000
Reserves and Surplus	8,00,000
9% Preference Share	12,00,000
7% Debentures	10,00,000
Total Capital	50,00,000

The company earns 12% on its total capital. The company proposes to invest Rs. 25 Lakhs in an expansion programme. The following alternatives are available.

Plan A Issue of 20,000 equity share at a premium of Rs. 25.

Plan B Issue of 10% preference shares.

Plan C Issue of 8% Debentures.

The price earnings ratios are estimated as follows: Plan A - 13; Plan B - 12; Plan C - 10. Evaluate the financing plans and make your recommendation, assuming a corporate tax rate of 50%. (20)

- b) Financial Services industry in India has grown remarkably during the last few years. Do you agree? Explain various developments in brief. (15)
- c) Explain the Modigliani-Miller hypothesis of dividend irrelevance. Does this hypothesis suffer from any deficiencies? Discuss. (15)

8. a) Sirus Care Ltd. needs Rs. 11,00,000 for the installation of a new factory which is expected to earn an EBIT of Rs. 1,80,000 per annum. The company has the objective of maximizing the earning per share. It is considering the possibility of issuing equity shares plus raising a debt of Rs. 2,00,000 or Rs. 5,00,000 or Rs. 9,00,000. The current market price of the share is Rs. 40 and will drop to Rs. 25 if the borrowings exceeds Rs. 7,50,000. The cost of borrowings are indicated as under : (20)

Upto Rs. 2,50,000	10%
Rs. 2,50,000 - 6,25,000	14%
Rs. 6,25,000 - 10,00,000	16%

Assuming the tax rate to be 30%, find out the EPS under different options.

- b) Distinguish between a Funds flow statement and a Cash flow statement. (15)
- c) What is the role of IRDA in regulating insurance business. Explain the role played by IRDA in consumer protection and awareness. (15)

CC(M)
ECONOMICS
(OPTIONAL)
PAPER - I

[21]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION - A

Answer the following questions in about **150 words each**.

(5×10=50)

1.
 - a) "Monopolistic firms can earn supernormal profits in the short run which gets eroded in the long run". Explain. **(10)**
 - b) "The marginal propensity to consume for an individual facing a Real Business Cycle depends on the nature and persistence of shocks that he faces in the economy". Explain. **(10)**
 - c) "Friedman's monetarist approach of money demand is an extension of the Cambridge Cash Balance approach". Elaborate this statement by highlighting the factors that determine the demand for money according to monetarist approach. **(10)**
 - d) "A bird in hand is worth two in the bush". Evaluate the statement through various theories of rate of interest. **(10)**
 - e) Write a note on the "Crowding out effect" and the factors that determine the extent of crowding out in a closed economy IS-LM model. **(10)**
2.
 - a) What is "Money Multiplier"? Critically evaluate Fisher's "Quantity Theory of Money". **(20)**
 - b) "Cournot equilibrium is an example of a Nash equilibrium". Justify this statement by elaborating on the strategies adopted by firms operating based on the **Cournot's** model of duopoly. **(15)**
 - c) Critically evaluate "Arrow's Impossibility Theorem". **(15)**
3.
 - a) "Trade is an engine of economic growth". Justify the same with some classical and modern theories of international trade. **(20)**
 - b) What are major differences between Keynesian and Neo-classical models of investment? How Chenery model is an improvement on Keynesian model of investment. **(15)**
 - c) What factors do governments consider when deciding whether to levy a tax or grant a subsidy? Explain. **(15)**
4.
 - a) Are "Trade Blocks" advantageous to India? Evaluate with the special reference to SAARC. **(20)**
 - b) How do elasticity of demand and supply determine the incidence of taxes among producers and consumers? **(15)**
 - c) "Real depreciation of a country's domestic currency may not help in improving its current account position". Discuss this statement in light of the response of export and import volumes to real exchange rate changes. **(15)**

SECTION - B

5. Answer the following questions in about **150 words each** :

- a) Write a short note on the Stolper-Samuelson Theorem of Trade. (10)
- b) Critically examine the Malthusian Population Trap. (10)
- c) How many growth rates are there in the Harrod's model? What factors are ignored by Harrod's model? (10)
- d) What are the most typical problems associated with environmental degradation? Suggest the most important remedies. (10)
- e) What constitutes sound trade policy? What impact does trade policy have on the country's development? Make recommendations for ways to strengthen India's trade policy. (10)

- 6.
- a) What addition did Gunnar Myrdal and Simon Kuznets make to development economics theory? (20)
 - b) How do Grand Utility Possibility Frontier and "Point of Bliss" help in maximising social welfare? (15)
 - c) Define the concept of "Factor Abundance" and how does it contribute towards deciding the shape of the Production Possibility Frontier of nations? (15)

- 7.
- a) Illustrate Keynesian underemployment equilibrium graphically. How is it different from the unemployment assumed by the classical economists? (20)
 - b) Discuss in brief the inter-temporal nature of a simple real Business Cycle model. (15)
 - c) Explain IS-LM model with diagram. (15)

- 8.
- a) In welfare economics, what are compensation criteria? Which Kaldor-Hicks allocations are the most efficient and why? (20)
 - b) "Demand for money by an individual depends on the level of risk that he is willing to take". Justify. (15)
 - c) Analyse the relationship between inflation and level of government deficits. (15)

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CC(M)
ELECTRICAL ENGINEERING
(OPTIONAL)
PAPER - I
[23]

Time Allowed - Three Hours

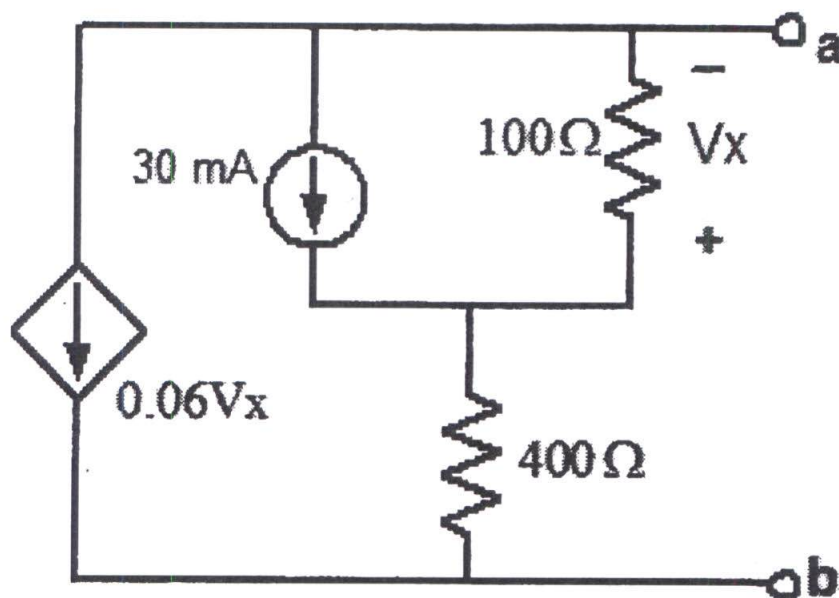
Maximum Marks-250

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- b) Find the Norton's equivalent circuit to the left of the terminals a and b for the circuit shown in figure. (15)



- c) A very long solenoid with square cross-section of $5 \text{ cm} \times 5 \text{ cm}$ has an iron core with $\mu_r = 2000$ and 1000 turns per meter. If the energy stored per meter is 5 J, what is the magnitude of current the solenoid carries? (15)
3. a) Primary and secondary windings of a 200 kVA, 4400 V: 440 V, 50 Hz distribution transformer have leakage impedance of $(0.6 + j0.8) \Omega$ and $(0.0050 + j0.007) \Omega$, respectively. Magnetizing branch accounts for $(5.45 + j40.2) \Omega$ impedance for the excitation current when viewed from the low-voltage side of transformer. The high-voltage winding of this transformer is connected to 4400 V feeder line having impedance of $(0.20 + j1.2) \Omega$. (20)
- Draw the equivalent circuit of transformer referred to the high-voltage side.
 - Find the voltage at the low-voltage winding of the transformer when load connected to it draws rated current at a power factor of 0.707 lagging. Ignore the voltage drop caused by magnetizing current.
- b) Consider the signal (15)
- $$x(t) = u(t+1) + u(t-3) - 2u(t-5),$$
- Where $u(t)$ is the unit step signal.
- Find the energy of the signal $x(t)$.

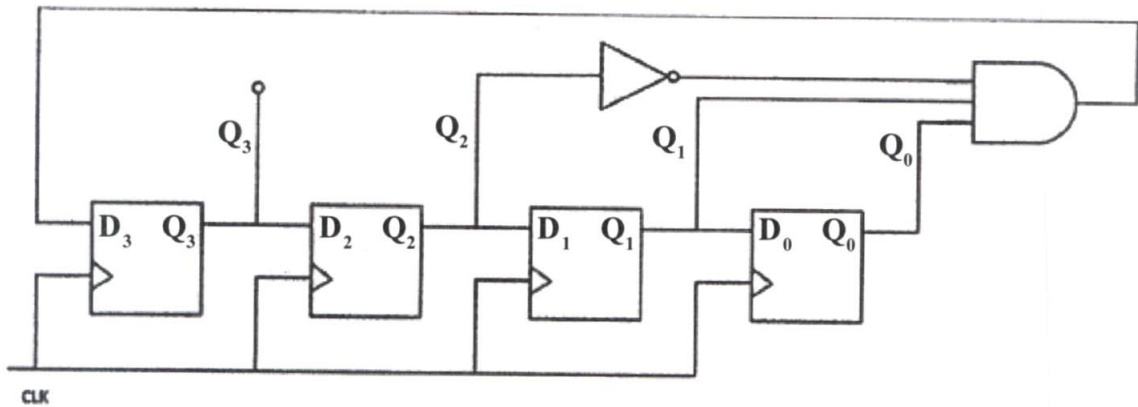
- ii) Determine and sketch the even component of the signal $x(t)$.
- iii) Determine and sketch the signal $x(2t+1)$
- iv) If $x(t)$ is given as the input to an LTI system with impulse response

$$h(t) = u(t) - u(t-1),$$

Determine and sketch the output signal $y(t)$.

- c) Suppose a superheterodyne receiver uses a local oscillator at L_0 MHz and receives two RF signals centered at 0.55 MHz and 1.75 MHz. Determine the possible frequencies L_0 of local oscillator between 0.55 MHz and 1.75 MHz which can cause image interference. (15)

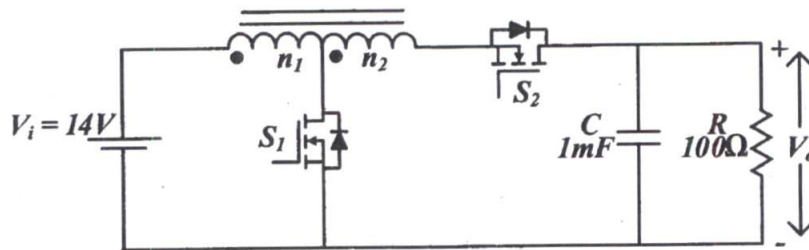
4. a) Obtain the state diagram of the synchronous sequential circuit shown in figure. Use the state names as $S_0 - S_{15}$ for $Q_3Q_2Q_1Q_0 = 0000 - 1111$ (20)



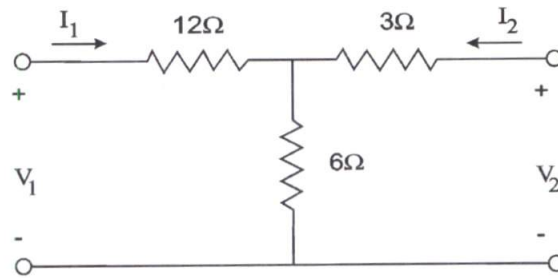
- b) A 230 V, 1000 rpm and 105 A separately excited dc motor has an armature resistance of 0.06Ω . The motor is fed from a step-down chopper which provides both motoring and braking operations and has a source voltage of 230 V. Assume continuous conduction operation. (15)
 - i) Calculate the duty ratio of the chopper for motoring operation at rated torque and 400 rpm.
 - ii) What will be the maximum allowable speed of motor obtainable without field weakening if the maximum allowable motor current is 1.5 times of the rated current and maximum duty ratio of chopper is limited to 0.95.
- c) The circuit constants R and L of a coil are to be found by placing the coil in series with a 10Ω resistor R_s and reading the voltages across the coil, across R_s and across the complete circuit. Determine R and L if the following 50 Hz voltages were read: $V_{R_s} = 16$ V, $V_{\text{coil}} = 22.4$ V, $V_T = 36$ V, where V_T is the voltage across the complete circuit. (15)

SECTION - B

5. a) Load torque for a fan load is defined as: $\tau_L \propto \omega^2$. This fan load is driven through a separately excited DC motor. If the motor takes 10 A with input terminal voltage maintained at 200 V, the fan operates at 500 rpm. Determine the terminal voltage and input current for operating the fan at 1000 rpm. Assume that the armature circuit resistance is 0.5Ω and brush drops & mechanical losses are negligible. (10)
- b) For the DC-DC converter shown in figure, find the output voltage V_o . The switches S_1 and S_2 are switched in a complementary manner with conduction period of S_1 and S_2 kept at $60 \mu s$ and $40 \mu s$, respectively. The switching frequency of the switches is kept at 10 kHz. The values of $n_1 = 3, n_2 = 2$. Assume the switches are ideal and the converter is lossless. (10)



- c) Find the hybrid parameters of the two-port network shown in figure. (10)



- d) Design a CMOS logic gate for the following function. (10)

$$f = \overline{A.(B+C) + D.E}$$

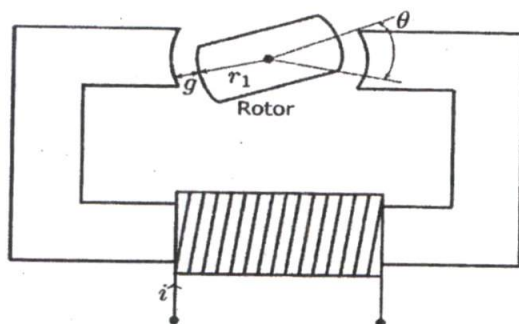
- e) Consider two bandlimited signals $x_1(t)$ and $x_2(t)$ having Nyquist rates 2 KHz and 4 KHz, respectively. Determine the Nyquist rate for the following signals: (10)

i) $x_1(t) + x_2(t)$

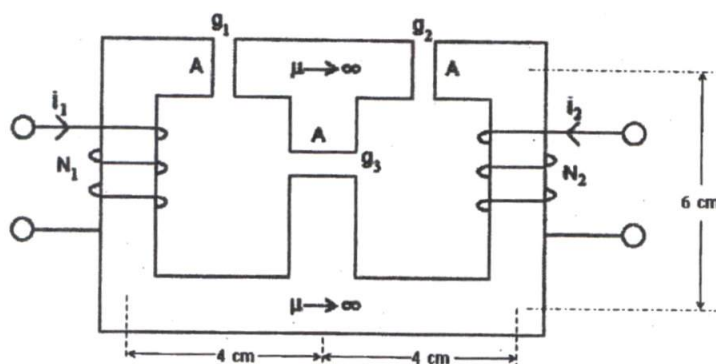
ii) $x_1(t).x_2(t)$

6. a) The magnetic circuit, shown in figure, is made of high-permeability steel. Rotor is free to turn about a vertical axis passing through the centre. Dimensions are shown in the Figure. Axial length (perpendicular to the paper) of magnetic circuit is h and the coil has N turns with i current flowing into it.

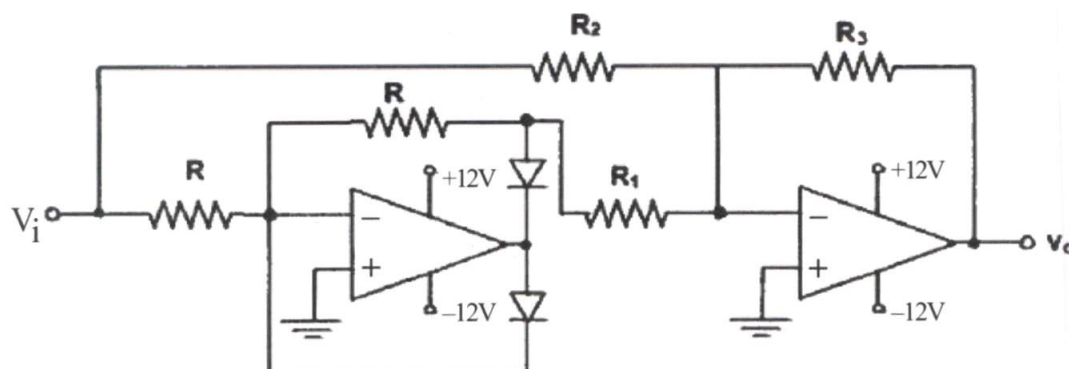
- i) Derive an expression for torque acting on rotor in terms of parameters of the magnetic circuit. Consider that permeability of air is μ_0 . Ignore reluctance of the steel and any fringing effects.
- ii) If maximum flux density in the air-gap is restricted to 1.65 T and maximum current in the coil is restricted to 10 A, compute the maximum torque developed by the system and the number of turns in the coil. Consider $r_1 = 2.5$ cm, $h = 1.8$ cm, $g = 5$ mm and $\mu_0 = 4\pi \times 10^{-7}$. (20)



- b) Figure shows a magnetic circuit with air gaps $g_1 = g_2 = g_3 = 1$ mm and coils $N_1 = 200$ turns and $N_2 = 100$ turns. The cross-sectional area A of the circuit is $20 \text{ mm} \times 10 \text{ mm}$. The currents in the coils are $i_1 = i_2 = i$. Assume the permeability of the core material is infinity. The fringing effect is not neglected. Find an equivalent electric circuit and determine the current i if the flux in the air gap g_3 is 8×10^{-5} wb downwards. (15)



- c) Verify that the circuit shown in figure gives full wave rectified output provided $R_2 = K R_1$. Find the value of K . What is the peak value of the rectified output? (15)



7. a) Consider the FM signal

$$S(t) = 10 \cos[2\pi \times 10^6 t + 2 \sin(2\pi \times 10^3 t) + 4 \sin(4\pi \times 10^3 t)].$$

Find the following:

- i) Peak frequency deviation
- ii) Transmission bandwidth
- iii) Average power of the FM signal (20)

- b) The input signal $x(t)$ and the output signal $y(t)$ of a causal LTI system are related by the following differential equation: (15)

$$\frac{d^2 y(t)}{dt^2} + 5 \frac{dy(t)}{dt} + 6y(t) = \frac{dx(t)}{dt} + x(t).$$

- i) Determine the frequency response of the system.
 - ii) Determine the impulse response of the system.
 - iii) Determine the output signal for the input $x(t) = e^{-t}u(t)$.
- c) A three-phase Y-connected 400 V (line-to-line), 3.75 kW, 50 Hz four-pole induction motor has following per-phase parameters referred to stator— (15)

$R_s = 1.28 \Omega$	$R_r = 1.4 \Omega$	
$L_{ls} = 7.89 \text{ mH}$	$L_{lr} = 7.89 \text{ mH}$	$L_m = 260 \text{ mH}$

Total friction, windage and core losses may be assumed to be constant at 200 W, independent of load. Compute the output torque, power factor and efficiency when motor is operated at rated voltage and frequency. Assume that slip is 2%.

8. a) A point charge of 20 nC is located at point (2, 2, 2), and a uniform line charge of 10 nC/m is at the intersection of planes $x = 4$ and $y = 4$. Both the charges are in free space. If the potential at the origin is 200 V, find the potential at point P(1, 1, 1). (20)
- b) A 3-phase fully controlled bridge converter charges the battery from the three-phase supply of 400 V (line to line), 50 Hz. The battery open circuit emf is 400 V, and the internal resistance is 0.5Ω . A large inductor is connected in series with the battery to maintain the constant charging/discharging current. (15)
- i) Calculate the firing angle delay (in degrees) if the battery is charged with the constant current of 20 A.
 - ii) If the firing angle is kept at 45 degrees, calculate the magnitude of per phase input supply voltage to keep the charging current of 20 A.
- c) A four-variable (w, x, y, z) Karnaugh map (K-map) assumes the value 1 for the minterms 1, 3, 4, 5, 7, 8, 9, 11, 14, 15 and the value 0 for the minterms 0, 2, 6, 10, 12, 13. Find three minimal expressions. (15)

CC(M)
ENGLISH
LITERATURE
(OPTIONAL)
PAPER - I
[25]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION - A

1. Write short notes on each of the following. Each question should be answered in about 150 words: (5×10=50)
- a) Renaissance and the Early Modern Literature. (10)
 - b) The Philosophy of love in Metaphysical Poetry. (10)
 - c) Forms of English Satire in the 18th Century. (10)
 - d) Romanticism. (10)
 - e) The Enlightenment and the English Novel. (10)
2. a) Critically comment on the theme of imperialism in any two poems of John Donne prescribed in your syllabus. (20)
- b) Discuss the idea of forgiveness and reconciliation in Shakespeare's *The Tempest*. (15)
- c) Discuss the role of the Fool in Shakespeare's *King Lear*. (15)
3. a) Alexander Pope's *The Rape of the Lock* is a subtle critique of the British Colonialism. Discuss with illustrations from the text. (20)
- b) What is the role of childhood and memory in William Wordsworth's *Ode on Intimations of Immortality*? (15)
- c) Critically examine the theme of disobedience and revolt in the Book I and IX of Milton's *Paradise Lost*. (15)
4. a) Critically examine the ending of Henrik Ibsen's *A Doll's House*. (20)
- b) Discuss Tennyson's *In Memoriam* as an attempt to find solace in nature and religion while dealing with grief. (15)
- c) How is the relationship between the man and the nature explored in William Wordsworth's *Tintern Abbey*? (15)

SECTION - B

5. Study the following poem and answer the questions that follow. Each answer should be in around 60-80 words: (5×10=50)

Beyond all this, the wish to be alone:
However the sky grows dark with invitation-cards
However we follow the printed directions of sex
However the family is photographed under the flag-staff-
Beyond all this, the wish to be alone.

Beneath it all, The desire for oblivion runs:
Despite the artful tensions of the calendar,
The life insurance, the tabled fertility rites,
The costly aversion of the eyes away from death
Beneath it all, the desire for oblivion runs.

- a) Critically comment on the theme of the poem. (10)
 - b) Analyze the imagery of 'invitation-cards' and 'printed directions of sex.' (10)
 - c) Explain the use of repetition in the poem. (10)
 - d) Explain: "The life insurance, the tabled fertility rites, / The costly aversion of the eyes away from death-" (10)
 - e) Write a short note on the diction of the poem. (10)
6. a) 'Jonathan Swift's Gulliver's Travels is a brilliant critique of the idea of enlightenment logic and reason.' Discuss with examples from Book IV of the novel. (20)
- b) Discuss the theme of American Dream as represented in Mark Twain's *The Adventures of Huckleberry Finn*. (15)
- c) Can Thomas Hardy's *Tess of the d'Urbervilles* be read as the encounter between industrial modernity and traditional rural life. Give a reasoned answer. (15)

7. a) Discuss Henry Fielding's *Tom Jones* as a 'Comic epic in Prose.' (20)
- b) Critically discuss Jane Austen's *Pride and Prejudice* as a fictional representation of heterosexual love as determined by the institution of marriage in 18th and 19th century England. (15)
- c) Would you agree with the following statement of Ernest Hemingway "All modern American literature comes fromHuckleberry Finn." Give a reasoned answer.(15)
8. a) Charles Dicken's *Hard Times* is a thorough critique of utilitarian ethics. Discuss with suitable examples from the text. (20)
- b) How is the class difference in contemporary England explored in Jane Austen's *Pride and Prejudice*? (15)
- c) Discuss George Eliot's *The Mill on the Floss* as a bildungsroman. (15)
-

CC(M)
GEOGRAPHY
(OPTIONAL)
PAPER - I
(27)

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION A

Answer the following questions in about 150 words each:

(5×10=50)

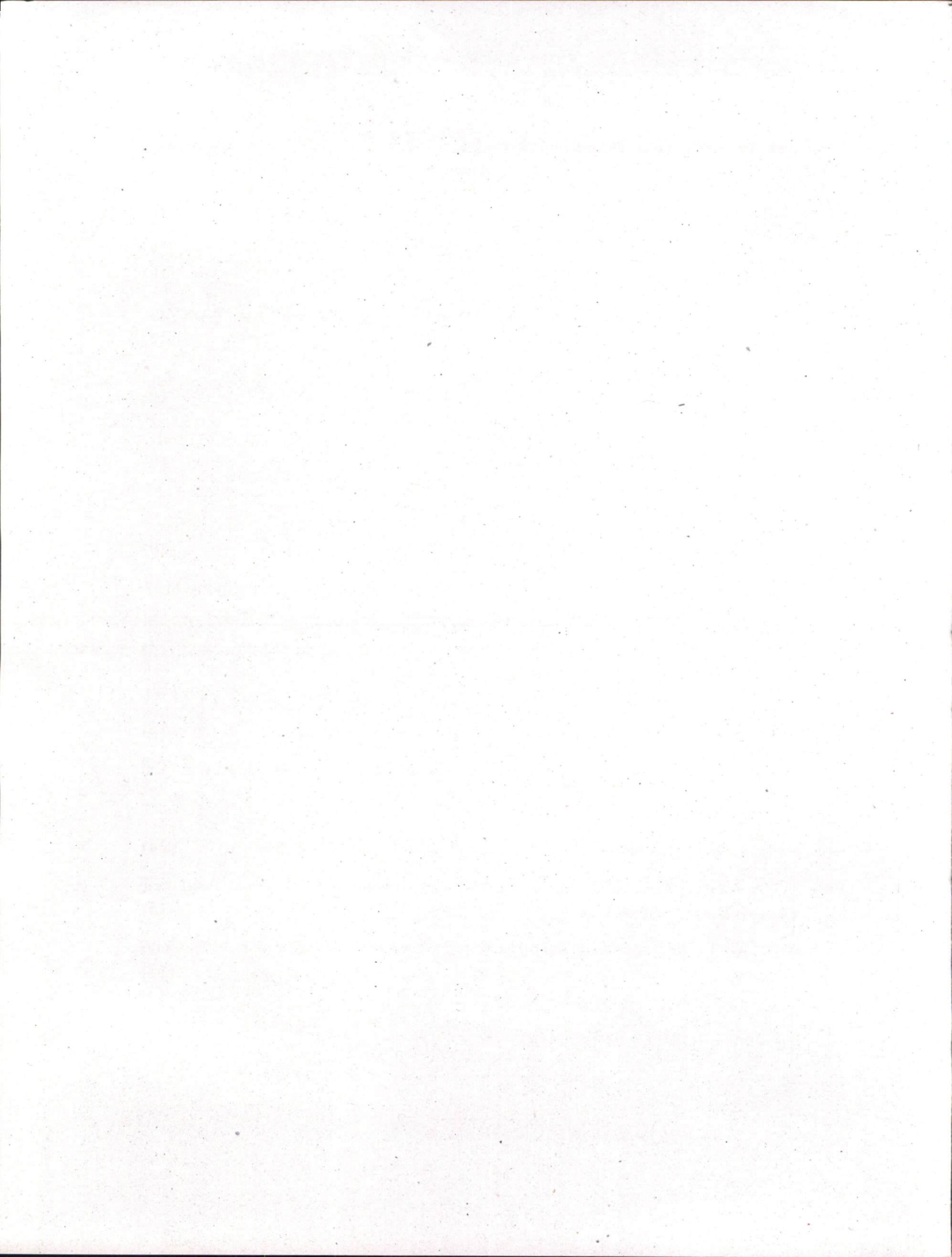
1.
 - a) Explain Earth's Magnetic Field. Do you agree with the scientific input that it has shown signs of weakness and how it is going to impact earth and human beings. (10)
 - b) Evaluate the state of atmospheric stability and instability and its effect on air quality. (10)
 - c) Why sea level is changing and evaluate its short-term and long-term implications. (10)
 - d) Evaluate the role of System Analysis in Geography. (10)
 - e) Discuss the properties and characteristics of Tropical Cyclone. (10)
2.
 - a) Explain the characteristics of channel morphology and how far it is important for the health of the river. (20)
 - b) Evaluate climate change and highlight its consequences on the urban health. (15)
 - c) Critically examine the difference between Plate Tectonics and Continental Drift. (15)
3.
 - a) With increasing social and economic compulsion of life the population growth rate is declining. Evaluate your answer in the light of "Lying Flat" movement in China. (20)
 - b) Evaluate the role of trading blocks in understanding trading patterns in the world. (15)
 - c) Highlight the urban threats and probable solutions for the sustainable future of the cities. (15)
4.
 - a) Explain "Urban Heat Island". Does it have any consequences on natural and human health. (20)
 - b) Evaluate major developments in the International Laws and their relevance in protection of marine environment. (15)
 - c) Highlight the major characteristic features of "Gene Pool Centres" and their importance in genetic diversity. (15)

SECTION - B

Answer the following question in 150 words.

(5×10=50)

5.
 - a) What are the main principles of EIA and discuss the significance of EIA in various development projects. (10)
 - b) Evaluate Sustainable Development Goal No-11 and highlight how it can achieve sustainability of cities in the world. (10)
 - c) Evaluate the mountain building process and highlight its relationship with recent view points. (10)
 - d) Evaluate climate change and its related human adaptation and adjustments in the world. (10)
 - e) Critically analyse the Heartland and Rimland theory and evaluate that why Rimland is more important than Heartland. (10)
 6.
 - a) What is coral bleaching. Explain mass bleaching events and probable impact in different oceans. (20)
 - b) Explain genesis of soils and how they differ in different ecological conditions. (15)
 - c) What are the fundamental concepts and principles of ecology in terms of eco-system. (15)
 7.
 - a) What is areal differentiation and highlight its status and relevance in geography. (20)
 - b) Explain the different approaches to study economic geography. (15)
 - c) Evaluate the concept of over-under and optimum population in geography. (15)
 8.
 - a) Highlight the advantages and threats of population as Social Capital. (20)
 - b) How far geographical knowledge help in understanding natural disasters and their related risk and vulnerability. (15)
 - c) What are the implications in understanding Isostasy from the view point of Airy and Pratt. (15)
-



CC(M)
GEOLOGY
(OPTIONAL)
PAPER - I

[29]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION - A

1. Answer the following in about 150 words each. (5×10=50)
- a) Describe the types of plate boundaries. (10)
 - b) What are the different types of glacial landforms? (10)
 - c) Describe about different types of strain ellipsoids using Flinn diagram. (10)
 - d) Describe the types of meteorites and their use in geology. (10)
 - e) Describe criteria to identify faults. (10)
- 2.
- a) Describe major types of volcanic eruptions. Also explain the global pattern of volcanism in relation to plate tectonics. (20)
 - b) Explain the nebular theory of origin of the earth. (15)
 - c) What is island arc? How are these formed? (15)
- 3.
- a) Describe the physical and chemical weathering processes in detail. (20)
 - b) Describe the elements of photograph interpretation in geology. (15)
 - c) Give an account of Davis's Geomorphic cycle. (15)
- 4.
- a) Describe the criteria to identify folds in the field. Give their genetic classification based on the interlimb angle and dip isogons. (20)
 - b) Discuss about various secondary foliations observed in rocks. With suitable diagrams, discuss the usefulness of axial planar cleavage in structural analysis. (15)
 - c) With neat sketches, describe different components of plumose structure observed on a joint surface. (15)

SECTION - B

- 5.
- a) Discuss briefly about Trilobites and their stratigraphic importance. (10)
 - b) Describe the classification of aquifers. (10)
 - c) Differentiate between hydrologic conductivity and transmissivity. (10)
 - d) Describe tectonic sub-divisions of Himalaya. (10)
 - e) Write a brief note on coal bearing formations of Lower Gondwana Group. (10)

6. a) What are microfossils? Describe the application of Ostracods as indicators of paleoclimate. (20)
- b) Discuss the various taphonomic processes that lead to the fossilization of organisms. (15)
- c) What are the major trends in the evolution of horse? Discuss various stages of this evolution and climate changes associated with them. (15)
7. a) Describe the classification of Siwalik Group along with its depositional environment and associated faunal assemblage. (20)
- b) What is chronostratigraphy? Describe the chronostratigraphic time scale for Precambrian Eon. (15)
- c) What is the geological importance of Permian-Triassic (PT) boundary? Give examples of type locations of PT boundary in India. (15)
8. a) Discuss and describe various methods/treatments which are employed for driving of tunnel through weak rocks for major engineering projects such as hydroelectric projects. (20)
- b) Comment upon causes and prevention of landslides. (15)
- c) Explain the necessity of artificial ground water recharge. What procedures are adopted for artificial recharge? (15)
-

Total No. of Printed Pages-4]

Roll No. _____

CC(M)
HISTORY
(OPTIONAL)
PAPER - I
[31]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION - A

1. Mark the following places on the map supplied to you with a short note not exceeding 30 words on the places plotted by you: (20×2.5=50)

- i) Bhimbetka
- ii) Dhaulavira
- iii) Burzahom
- iv) Lothal
- v) Kalibangan
- vi) Orchha
- vii) Daimabad
- viii) Kanchipuram
- ix) Ahmedabad
- x) Abhaneri
- xi) Mahabalipuram
- xii) Nalanda
- xiii) Khajuraho
- xiv) Tanjore
- xv) Chittorgarh
- xvi) Golconda
- xvii) Belur
- xviii) Ropar
- xix) Ellora
- xx) Mysore

2. a) What were the major factors responsible for the flow and ebb of the Indus Valley Civilization? (20)
- b) "Not only does the ancient Tamil literature furnish an accurate picture of different classes; it also describes the geographical, social condition of Tamil country as it was." Examine. (15)
- c) Discuss the ways in which the egalitarian character of the early Vedic society changed during the later Vedic period. (15)

3. a) "The political and economic needs of the rulers, combined with economic and status needs of the merchant class, together provided the receptive cultural milieu in which Buddhism flourished." Comment. (20)
- b) Discuss the interpretations of historians about the nature of Ashoka's 'Dhamma'. Did his principle of 'Dhamma - Vijaya' render the Mauryan empire militaristically weak? (15)
- c) Describe the nature and impact of India's contact with Western Asia and the Mediterranean world during the Mauryan age. (15)
4. a) Discuss the evolution of different schools of art in the Indian subcontinent between the second century BCE and the third century CE and assess the socio-religious factors responsible for it. (20)
- b) Would you agree that the system of land grants from the Gupta-Vakataka period was related with the decentralization of the state in any way? (15)
- c) In what ways does the numismatic evidence of the period reflect the political and economic outlook of the Kushanas and the Satavahanas? (15)

SECTION - B

5. Write short notes in not more than 150 words in each of the following. (5×10=50)
 - a) Early medieval temple architecture of Kashmir. (10)
 - b) Steps taken by Razia Sultan to strengthen her position as an independent ruler. (10)
 - c) Bhakti and mysticism of Lal Ded emerging as a social force in Kashmir. (10)
 - d) Jonaraja's account of the rule of Zain-ul-Abidin. (10)
 - e) Transformation of Sikh community from a Nirguna Bhakti sect into a politico-military organization. (10)
6. a) Evaluate the statement that 'the philosophy of Shankaracharya revolutionized religious thought in India. (20)
- b) *Rajtarangini* of Kalhana is a reliable source for understanding the cultural and political history of Kashmir? Comment. (15)
- c) Analyze the significance of Uttaramerur Inscriptions of the Chola King Parantaka - I. (15)

7. a) Panditaraja Jagannatha was instrumental in developing a powerful literary tradition in medieval India. Discuss. (20)
- b) The mission of Kabir was to preach a religion of love which would unite all castes and creeds. Elucidate. (15)
- c) Critically evaluate Akbar's Rajput policy as a conscious measure to connect them to the Mughal Imperial System. (15)
8. a) Critically evaluate the development of paintings under Mughal rulers with special reference to colours, techniques, themes and influences on them. (20)
- b) Examine the approach of revisionist historians in viewing the 18th century as a 'Dark Age'. (15)
- c) Shivaji was not merely a Nationalist Indian but also was an enlightened ruler. Discuss. (15)
-

CC(M)
LAW
(OPTIONAL)
PAPER - I
[33]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION - A

Write short notes on the following in around **150 words each**.

(5×10=50)

1. a) Distinguish between 'Constituent Power', 'Amending Power' and 'Legislative Power', with appropriate examples. **(10)**
- b) Eviction from Public Premises and Article 14 challenges. **(10)**
- c) The Doctrine of Eclipse. **(10)**
- d) The Doctrine of Prospective Overruling. **(10)**
- e) Write a brief note on the interplay between the Lokpal, Lokayukta, CBI and CVC in dealing with bribery cases against public servant. **(10)**

2. a) The Parliament of India, in a historic move, aims to codify the Basic Structure Doctrine. borrowing from the lists of the majority Judges in *Kesavananda*, this newly enacted chapter called "Basic Structure" would enlist the components of the lists, and this chapter would start with an Article that states:

"Any amendment to this Constitution must never contradict the principles embodied in this Chapter but solely relate to modifications of particular provisions which do not alter the spirit of the Constitution".

Do you think incorporation of such a Chapter is constitutionally tenable? Critically evaluate, with reference to appropriate precedents. **(20)**

- b) In order to prevent the viral spread of malicious information over the internet that occasionally results in causing violence and other similar forms of public order disturbance, the Government very often takes resort to the Temporary Suspension of Telecom Services (Public Emergency or Public Safety) Rules, 2017, which authorizes the government to, subject to certain procedural requirements being observed, temporarily shut down internet services in the affected areas. In light of our existing Fundamental Rights Jurisprudence, analyse the constitutional validity of the said rule. **(15)**
 - c) "Right to legal aid is a fundamental right". Discuss with help of Constitutional provisions and Case Law. **(15)**
3. a) What do you mean by *Audi Alteram Partem*. Also discuss the exceptions to the Principle of Natural Justice with the help of decided cases. **(20)**
 - b) Why is Delegated Legislation significant in India? What are the constitutional limitations on the delegation of legislative power in India? **(15)**
 - c) Critically examine the functioning of collegium system for appointment of judges in India. **(15)**

4. a) To ensure a cohesive administration of governmental affairs, the two concepts of cooperative federalism and competitive federalism have emerged. These two have been consolidated into several policies that aim at encouraging administrative efficiency, optimum utilization of resources, and realization of greater public good. Comment on the same along with contemporary examples to substantiate. (20)
- b) Administrative law has embodied several principles and doctrines within its essence to further mandate the effective governance model from time to time. The Principle of Proportionality and Doctrine of Legitimate Expectations have gained traction in India, especially to conduct the judicial review of executive actions. Write a detailed note on these two doctrines and supplement them with case laws. (15)
- c) Discuss in detail the grounds for imposition of President's Rule in a state. What is the role of Governor of such state in imposition of President's Rule? (15)

SECTION - B

5. Write short notes in around **150 words each**. (5×10=50)
 - a) Communist approaches to International Law. (10)
 - b) *Jus Cogens* (10)
 - c) The continental shelf. (10)
 - d) Principle of double criminality and principle of speciality in respect of Extradition. (10)
 - e) The right of self defence under International Law. (10)
6. a) "The general rule with regard to the position of municipal law within the international sphere is that a state which has broken a stipulation of international law cannot justify itself by referring to its domestic legal situation." Do you agree with the statement? Elaborate in the light of cases decided by different regional and/or international tribunals. (20)
- b) Elucidate the principle of State Recognition under International Law. (15)
- c) What are the fundamental attributes of statehood in international law? Enumerate with support of relevant cases. (15)
7. a) The Supreme Court in *Vishaka & Ors vs State of Rajasthan* (1997) made following observation:

“The International conventions and norms are to be read into them in the absence of enacted domestic law occupying the fields when there is no inconsistency between them. It is now an accepted rule of judicial construction that regard must be had to international conventions and norms for constructing domestic law when there is no inconsistency between them and there is a void in the domestic law.”

Discuss what role international law plays in municipal courts citing cases decided in different jurisdictions. **(20)**

- b) The basic principle relating to jurisdiction on the high seas is that the flag state alone may exercise rights over the ship. However, there are exceptions to the exclusivity of flag-state jurisdiction. Discuss in detail principles relating to jurisdiction on the high seas and exceptions to the exclusivity of flag-state jurisdiction citing examples. **(15)**
 - c) Define Exclusive Economic Zone and discuss in detail the nature of rights available to the coastal states in such a Zone and rights of other states in the same zone. **(15)**
8. a) International Law has always considered its fundamental purpose to be the maintenance of peace. Hence it is necessary that elaborate dispute settlement mechanism should be provided for resolution of international disputes. What are the different modes of settlement of disputes by peaceful means available under International Law? Elucidate. **(20)**
- b) The United Nations played significant role in promotion and protection of human rights globally. Elaborate and explain the role of United Nations in promotion and protection of human rights citing different human rights treaties adopted since its inception. **(15)**
 - c) What are the principles and objectives of WTO's Agreement on Trade Related Aspects of Intellectual Property Rights to protect intellectual property at global level? **(15)**
-

CC(M)
MATHEMATICS
(OPTIONAL)
PAPER - I
(37)

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION - A

1. a) Solve $x(1 - x^2)dy + (2x^2y - y - ax^3)dx = 0$ (10)
- b) Show that the three vectors $(1, 1, -1)$, $(2, -3, 5)$ and $(-2, 1, 4)$ of R^3 are linearly independent. (10)
- c) Show that the function f defined on R by.

$$f(x) = \begin{cases} x, & \text{when } x \text{ is irrational} \\ -x, & \text{when } x \text{ is rational} \end{cases} \quad \text{is continuous only at } x=0 \quad (10)$$

- d) Find the work done by the force $F = (2xy + z^3)i + x^2j + 3xz^2k$ when it moves a particle from $(1, -2, 1)$ to $(3, 1, 4)$ along any path. (10)
- e) Find the equation of the sphere that passes through the circle (10)

$$x^2 + y^2 + z^2 - 2x + 3y - 4z + 6 = 0,$$

$3x - 4y + 5z - 15 = 0$ and cuts the sphere $x^2 + y^2 + z^2 + 2x + 4y - 6z + 11 = 0$ orthogonally.

2. a) Find the asymptotes of the curve

$$4(x^4 + y^4) - 17x^2y^2 - 4x(4y^2 - x^2) + 2(x^2 - 2) = 0 \quad \text{and show that they pass through the points of intersection of the curve with the ellipse } x^2 + 4y^2 = 4. \quad (20)$$

- b) Solve

$$(D^2 + a^2)y = \tan ax, \quad \text{where } D \text{ has the usual meaning.} \quad (15)$$

- c) Show that the vectors $(1, 2, 1)$, $(2, 1, 0)$, $(1, -1, 2)$ form a basis of R^3 . (15)

3. a) The curve $y^2(a + x) = x^2(3a - x)$ revolves about the axis of x . Find the volume generated by the loop. (20)
- b) Use the Cayley Hamilton theorem to find the inverse of the matrix. (15)

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{bmatrix}$$

- c) Find the length of the perpendicular drawn from origin to the line $x + 2y + 3z + 4 = 0 = 2x + 3y + 4z + 5$

Also, find the equations of this perpendicular and the co-ordinates of the foot of the perpendicular. (15)

4. a) Find the rank of
$$\begin{bmatrix} 1^2 & 2^2 & 3^2 & 4^2 \\ 2^2 & 3^2 & 4^2 & 5^2 \\ 3^2 & 4^2 & 5^2 & 6^2 \\ 4^2 & 5^2 & 6^2 & 7^2 \end{bmatrix}$$
 (20)

- b) Find the points on the lines

$$\frac{x-6}{3} = -(y-7) = z-4 \text{ and } \frac{-x}{3} = \frac{y+9}{2} = \frac{z-2}{4} \text{ Which are nearest to each other.}$$

Hence find the shortest distance between the lines and also its equations. (15)

c) Evaluate
$$\int_0^a \int_0^{a-x} \int_0^{a-x-y} x^2 dx dy dz$$
 (15)

SECTION - B

5. a) Find the orthogonal trajectories of the family of Co-axial circles. $x^2 + y^2 + 2gx + c = 0$, Where g is the parameter. (10)

- b) If $u = 3x^2y$ and $v = xz^2 - 2y$, then find

$$\text{grad} [(grad u) \cdot (grad v)]$$
 (10)

- c) Solve $y'' - 2 \tan x \cdot y' + 5y = \sec x e^x$ (10)

- d) Find the equation of the plane through the line of intersection of the planes $ax + by + cz + d = 0$ and $\alpha x + \beta y + \gamma z + \delta = 0$ and Perpendicular to the xy -plane. (10)

- e) A Point moving in a straight line with uniform acceleration describes distances a, b feet in successive intervals of t_1, t_2 seconds. Prove that the acceleration is
$$2(t_1b - t_2a) / [t_1t_2(t_1 + t_2)]$$
 (10)

6. a) Solve the following system of equations, if consistent:- (20)

$$x - 4y - z = 3$$

$$3x + y - 2z = 7$$

$$2x - 3y + z = 10$$

- b) Find the equation to the cylinder whose generators are parallel to the line $x = \frac{y}{(-2)} = \frac{z}{3}$, and the guiding curve is the ellipse $x^2 + 2y^2 = 1, z = 3$. (15)

- c) Using method of variation of parameters, solve

$$\frac{d^2 y}{dx^2} - 2\left(\frac{dy}{dx}\right) + y = x e^x \sin x \text{ with } y(0) = 0 \text{ and } \left(\frac{dy}{dx}\right)_{x=0} = 0. \quad (15)$$

7. a) Find the equations to the line drawn parallel to $\frac{1}{4}x = y = z$ so as to meet the lines $5x - 6 = 4y + 3 = z$ and $2x - 4 = 3y + 5 = z$. (20)

- b) Solve $(D^4 + D^2 + 16)y = 16x^2 + 256$. where D has the usual meaning. (15)

- c) A string ABC has its extremities tied to two fixed points A and B is the same horizontal line. To a given point C in the string is knotted a weight W. Prove that the tension in the portion CA is.

$$\frac{WB}{4_c \Delta} (c^2 + a^2 - b^2). \text{ Where } a, b, c \text{ are the sides and } \Delta \text{ is the area of the triangle. (15)}$$

8. a) Two heavy particles of weight W and W' are connected by a light inextensible string and hang over a fixed smooth circular cylinder of radius a the axis of which is horizontal. If θ and θ' are the inclinations to the vertical of the radii drawn to the particles,

$$\text{show that } \frac{\sin \theta}{\sin \theta'} = \frac{w'}{w} \quad (20)$$

- b) Solve

$$6 \cos^2 x \left(\frac{dy}{dx} \right) - y \sin x + 2y^4 \sin^3 x = 0. \quad (15)$$

- c) Test for convergence of the series

$$1 + \frac{1}{2} \cdot \frac{x^2}{4} + \frac{1.3.5}{2.4.6} \cdot \frac{x^4}{8} + \frac{1.3.5.7.9}{2.4.6.8.10} \cdot \frac{x^6}{12} + \dots \quad (15)$$

CC(M)
MANAGEMENT
(OPTIONAL)
PAPER - I
[35]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION - A

1.
 - a) Explain pre scientific management theory. (10)
 - b) What are the legal provisions of Corporate Social Responsibility (CSR) in India. (10)
 - c) Explain virtual organizations with suitable examples. (10)
 - d) Explain the concept of Holistic marketing and its relevance for today's marketers. (10)
 - e) Describe the trait and behavioural theories of Leadership. (10)

2.
 - a) "Organization Behaviour represents interactions among individuals, groups and the organization" elucidate this statement. (20)
 - b) Explain the concept of 'Brick Stores' and 'Click Stores' with real life examples. (15)
 - c) During the last few years, a number of environmental and other regulations have been introduced to corporate. In the light of regulatory changes, is wealth maximization of shareholders a realistic objective? Explain. (15)

3.
 - a) Differentiate psychographic segmentation and geographic segmentation of markets. (20)
 - b) Explain various theories of capital structure. (15)
 - c) How is the cost of equity capital determined under Capital Asset Pricing Model (CAPM). (15)

4.
 - a) Discuss the role of technology for marketers and customers in the prevailing business environment. Discuss challenges in development of Rural entrepreneurship. (20)
 - b) Explain the various subsidiary books maintained by a firm. (15)
 - c) Experts argue that the companies need to focus on strategy formulation, implementation, competition and the like and not waste time and energy on matters relating to wages and salaries. Give your view point. (15)

SECTION - B

5.
 - a) Differentiate mechanistic and organic organizational design with suitable examples. (10)
 - b) What is skimming pricing? Explain the conditions when a skimming pricing strategy is advisable. (10)
 - c) Discuss the factors to be considered while deciding on whether to conduct marketing research inhouse or outsource it. (10)
 - d) Explain the personality traits that have relevance from the point of view of Organizational Behaviour. (10)
 - e) Explain the knowledge-based organizations with suitable examples. (10)

6. a) What is an ethical dilemma? Do you think managerial interventions are required for ethical conduct in any organization? If yes, elaborate. (20)
- b) Calculate cash flow from operating activities from the following information: (15)

Particulars	31-3-2019	31-03-2020
Profit & Loss Balance	50,000	1,80,000
Debtors	50,000	40,000
Creditors	25,000	20,000
Bills Receivable	10,000	12,500
Bills Payable	40,000	25,000
Outstanding Expenses	800	1,000
Accrued Income	6,000	7,000

- c) Write short notes on the following: (3×5=15)
- Human Resource Information System (HRIS)
 - Emerging issues in International HRM
 - Growth of E-business during pandemic
7. a) State the significance of inventory valuation. Distinguish between periodical and perpetual systems of inventory evaluation with suitable examples. (20)
- b) State the factors influencing stress suggest measures to overcome it. (15)
- c) Technology of business communication has undergone tremendous changes, briefly discuss merits & demerits of the tools used in e-correspondence. (15)
8. a) Why learning and behaviour modifications are equally essential in the life of an organization? Elaborate the role of reinforcement with regard to shaping the behaviour. (20)
- b) Explain fund flow statements and its components. Distinguish between fundflow and cash flow statements. (15)
- c) What is Blue Ocean Strategy? How does it help an organization to expand its business. (15)

CC(M)
MEDICAL SCIENCE
(OPTIONAL)
PAPER - I
[41]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION - A

1. a) Briefly describe the pharmacotherapy for (3×5=15)
- i. Acute migraine
 - ii. Paucibacillary leprosy
 - iii. Uncomplicated urinary tract infection
- b) A 20-year-old male patient from Bihar presented to medicine outpatient department with complaints of recurrent fever with chills for six months, progressive generalized weakness for five months and loss of appetite for one month. Rashes were present all over the body for one month. On general examination, the patient had moderate pallor, no icterus, no cyanosis and no lymphadenopathy. On abdominal examination, the liver was palpable about 2 cm below the right anterior costal margin and spleen was palpable up to 7 cm below the left costal margin. What could be possible cause of this presentation and what test can be done to confirm the same? How can this disorder be managed? (15+5=20)
- c) Describe the role of baroreceptors in regulation of blood pressure. Discuss the role of kidney in regulation of the blood pressure. (7+8=15)
2. a) Describe in detail the medico-legal responsibility of the registered medical practitioner working in an emergency setting of a tertiary care hospital for a case of 14-year-old girl brought with alleged history of eloping with a 22-year-old male. (10)
- b) Describe the shoulder joint under the following headings:
- i) Ligaments
 - ii) Rotator cuff
 - iii) muscles and nerve involved in abduction of the shoulder (3×5=15)
- c) With help of a line diagram, explain the functioning of fetoplacental unit (FPU). (10)
- d) Using schematic diagrams, describe the principal connections of basal ganglia. Write a note on Parkinsonism. (10+5=15)
3. a) Differentiate the following: (25)
- i) Microfilaments, Microtubules and Intermediate Filaments
 - ii) Keratinocytes, Melanocytes, and Langerhans' cells
 - iii) Proximal convoluted tubule, Distal convoluted tubule, and Collecting ducts
- b) Discuss the cerebrum under the following headings: (25)
- i) Nerve cells of the cerebral cortex
 - ii) Corticospinal tract – origin, course and termination
 - iii) Circle of Willis with a labelled schematic diagram

4. a) Describe the mechanism of feedback control of growth hormone secretion. State the direct and indirect action of growth hormone. Write a note on dwarfism. (5+10+5=20)
- b) i) With the help of two examples, explain how post translational modification of amino acids helps them in performing specific functions. (2+2=4)
- ii) Discuss the underlying inherited defects in metabolism/catabolism of phenylalanine and Glucose 6-phosphate. Delineate the metabolic consequences and management for these disorders. (4+4+2=10)
- iii) What are advanced glycation end (AGE) products? Elaborate the conditions under which they are formed in the body and their consequences. (2+2+2=6)
- c) Explain the alterations in metabolic pathways and change in the metabolites that maintain blood glucose levels as we sequentially progress from a well-fed condition to early and advanced stages of starvation. (10)

SECTION - B

5. a) Discuss briefly the mechanism of action and uses of (3×5=15)
- i) Vancomycin
- ii) Spironolactone
- iii) Acyclovir
- b) Discuss the Cryptococcus neoformans infection under following headings. (5+10=15)
- i) Diseases Caused
- ii) Laboratory diagnosis
- c) Write various classes of antihypertensive medicines with examples and their mechanisms of action. (20)
6. a) i) Describe the life cycle of malaria parasite. (10)
- ii) Describe the laboratory diagnosis of Malaria (10)
- iii) State the functions of the Health and Wellness Centers (HWC) launched by the Govt of India. What are the expanded range of services to be provided by HWC. (10)
- b) Discuss the advantages of Real Time PCR over a conventional PCR for prognostic applications. Which of these techniques is used for determining the effectiveness of treatment for viral infections? (8+2=10)
- c) Describe the anatomy of the cavernous sinus with a schematic diagram. Add a note on the anatomical basis of cavernous sinus thrombosis. (7+3=10)

[Turn Over

7. a) i) Explain the role of Retinoblastoma (Rb) protein in cell cycle control (10)
ii) Etiopathogenesis of bronchogenic carcinoma and role of predictive biomarkers in treatment of lung cancer. (6+4=10)
- b) i) Describe etiology, pathogenesis and histopathology of Tuberculosis with appropriate diagrams. (5+5+5=15)
ii) Explain pathogenesis of acute myeloid leukemia (AML) and chronic myeloid leukemia (CML). Tabulate major WHO subtypes of AML. (5+5+5=15)
8. a) Differentiate between (4×5=20)
i) Sea water and Fresh Water Drowning
ii) Wounds of Entrance and Exit of Bullet
iii) Suicidal and Homicidal Cut Throat Wounds
iv) Drug Addiction and Drug Habituation
- b) Discuss Confidentiality and Privileged Communication in medical practice. (10)
- c) Describe in brief: - (10+5+5=15)
i) Chelating Agents
ii) Filigree Burns
iii) Laboratory diagnosis of typhoid fever
-

CC(M)
PHILOSOPHY
(OPTIONAL)
PAPER - I
[43]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION-A

1.
 - a) Critically explain Kant's notion of Ideas of Reason. (10)
 - b) What are the main tenets of Logical Positivism? Why do Logical Positivists reject metaphysics? (10)
 - c) Present a critical account of Hegel's Absolute Idealism. (10)
 - d) Explain the difference between Primary and Secondary qualities according to Locke. (10)
 - e) What are the main points of difference between Plato's and Aristotle's conception of Forms? Discuss. (10)
2.
 - a) How does Wittgenstein's philosophical position change from 'Tractatus' to 'Philosophical Investigations'? Elaborately discuss. (20)
 - b) What are incomplete symbols according to Russell? Critically explain with examples. (15)
 - c) How does Strawson's theory of Person present a solution Cartesian Dualism? Critically discuss. (15)
3.
 - a) "The function of prayer is not to influence God, but rather to change the nature of the one who prays." Discuss. (20)
 - b) Explain Berkeley's theory of *esse est percipi*. How does Moore refute this position? (15)
 - c) What is wrong with Psychologism according Husserl? How does his Phenomenological method provide a solution to it? (15)
4.
 - a) "...I may venture to affirm of the rest of mankind, that they are nothing but a bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux and movement." Explain this quotation in light of Hume's 'Essay Concerning Human Understanding'. (20)
 - b) "All determination is *negation* (*omnis determinatio est negation*)" Explain this quotation in light of Spinoza's philosophy. (15)
 - c) "Every present state of a simple substance is the natural consequence of its preceding state, in such a way that its present is big with its future." Critically explain Leibnitz's position on Determinism and Freedom in the light of this statement. (15)

SECTION-B

5. a) Critically explain Arthāpatti (postulation) as a Pramāṇa (instrument of knowledge) according to Mīmāṃsā philosophy with suitable examples. (10)
- b) Critically examine the relationship between the Body and Consciousness according to Ārvāka philosophy. (10)
- c) Critically examine Buddhist theory of no-self. (10)
- d) How is *abhāva* (non-being) known according to Naiyāyikas? Critically discuss. (10)
- e) Explain *Akhyāti* Theory of error. (10)
6. a) Explain *aham*, *buddhi* and *mahat* as evolutes of Prakṛti. What are their respective functions according to Sāṃkhya philosophy? (20)
- b) Explain Jaina notion of *Kaivalya* (liberation). Explain the role of *Samvara* and *Nirjarā* in this context. (15)
- c) “*Mṛtika iti eva satyam*” (Clay alone is truth). Explain Sāṃkhya theory of *Satkāryavāda* with the help of this quotation from Chandogya Upanishad. (15)
7. a) Explain the difference between Śaṃkara's and Rāmānuja's position regarding the interpretation of *mahāvākya* “*tattvamasi*”. (20)
- b) Compare and contrast Buddhist's theory of Pratītyasamutpāda with Nyāya theory of *Asatkāryavāda*. (15)
- c) Give an account of the main arguments presented by Rāmānuja to refute Śaṃkara's notion of Māyā. (15)
8. a) Discuss the nature and role of *Vyāpti* (invariable concomitance) along with its different types with reference to Nyāya theory of Inference. (20)
- b) Explain the main tenets of Aurobindo's Integral Yoga. (15)
- c) Present a critical account of Jaina theory of *Syādavāda* and *Anekāntavāda*. (15)

CC(M)
PHYSICS
(OPTIONAL)
PAPER - I
[45]

Time Allowed - Three Hours

Maximum Marks-250

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SECTION - A

1.
 - a) An artificial satellite is revolving around the Earth at a distance of 620 km. Calculate the maximum velocity and time period of revolution given that the radius of the Earth is 6380 km and $g = 9.8 \text{ m/s}^2$. (10)
 - b) What do you understand by time dilation? Discuss one experiment in support of time dilation in special relativity. (10)
 - c) What are conservative and non-conservative forces? Show that the force $\vec{F} = yz\hat{i} + zx\hat{j} + xy\hat{k}$ is a conservative force. (10)
 - d) A coin kept inside water ($\mu = \frac{4}{3}$), when viewed from air in a vertical direction appears to be 3 mm. Find out the depth of coin in water. (10)
 - e) Show that in a head-on elastic collision between two particles the transferred energy is maximum when their mass ratio is unity. (10)

2.
 - a)
 - i) What is acceleration due to gravity (g)? How can we determine the value of g by using bar pendulum at the surface of Earth. (20)
 - ii) How does the value of g depend on distance as we move radially outward or inward from the centre of the Earth?
 - b) Derive an expression of kinetic energy for a relativistic particle. Hence deduce the Einstein mass energy relation. (15)
 - c) What is centre of mass? Show that in the absence of external forces, the velocity of centre of mass remains constant. (15)

3.
 - a) Define the harmonic oscillator in three-dimensions. Set up the equations of motion and obtain expressions for displacement, velocity and time period. Show that for harmonic oscillator problem, the average potential energy equals the average kinetic energy. (20)
 - b) A rocket starts vertically upward with initial speed V_0 . Show that its speed V at a height h is

$$V_0^2 - V^2 = \frac{2gh}{1 + h/R}$$
 Where R is the radius of the Earth, ' g ' is acceleration due to gravity. (15)
 - c) Describe Newton's rings How can they be used to calculate the wave length (λ) of laser light. (15)

4.
 - a) What is laser light? Explain stimulation emission process for He-Ne laser. (20)
 - b) State Bernoulli's theorem and apply it to obtain an expression for the reduction of pressure, when water flows through a constriction in pipe. (15)
 - c) What is diffraction grating? How can we calculate wave length of green light. Define grating element. (15)

SECTION - B

5.
 - a) What is quality factor in LCR circuit. Explain resonance frequency for LCR circuit. (10)
 - b) State and explain Ampere's and Faraday's law. (10)
 - c) A circular coil of radius $5 \times 10^{-2} m$ with 40 turns is carrying current of 0.25A. Find out magnetic field of circular coil at the centre. (10)
 - d) What is total internal reflection? Explain it with a diagram and give an example. (10)
 - e) State and explain Gibbs free Energy of thermodynamic system. (10)

6.
 - a) In the reference frame S , a particle of mass m is moving in the $+x$ direction with speed u and has momentum p and energy E . If another reference frame S' is moving at speed v in the standard way, then find the momentum p' and energy E' observed in S' .
 Show that $E'^2 - p'^2 c^2 = E^2 - p^2 c^2$. (20)
 - b) The energy of an oscillator with frequency ν is given by

$$\varepsilon = \frac{1}{2} h\nu, \frac{3}{2} h\nu, \dots, \left(n + \frac{1}{2}\right) h\nu, \dots$$
 (15)
 - i) Find the thermodynamic weight W_M and
 - ii) Determine the relation between the temperature of this system and E .
 - c) Derive the equation for the current in a damped LC circuit for low damping. (15)

7.
 - a) Prove that a linearly polarized electromagnetic wave can be formed by superimposing two circularly oppositely polarized waves of equal amplitudes. (20)
 - b) Derive Van der Waals equation for real gas and explain gas constants. (15)
 - c) What is displacement current? Explain it by Maxwell's equation. (15)

8.
 - a) Obtain the Stefan-Boltzmann law using Planck's radiation law. (20)
 - b) Define Fermi Energy. Calculate the probability of an electron occupying an energy level 0.02eV above the Fermi level at $T = 300K$. (15)
 - c) Explain Macro and Micro states. (15)

Total No. of Printed Pages-3]

Roll No. _____

CC(M)

POLITICAL SCIENCE AND INTERNATIONAL RELATIONS

(OPTIONAL)

PAPER - I

[47]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

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- vi) *No blank page be left in between answer to various questions.*

SECTION -A

1. Comment on the following in about 150 words each: (5×10=50)
 - (a) Explain the behavioral approach in Political Science. (10)
 - (b) Comment on the concept of “There is Is No Alternative (TINA)” in neoliberal state. (10)
 - (c) Why John Rawls calls justice as fairness? (10)
 - (d) Are liberty and equality incompatible? (10)
 - (e) Explain “Polyarchy” as given by Robert A.Dahl. (10)
2.
 - (a) Examine the relationship between power and hegemony. (20)
 - (b) “A State exists for the sake of good life and not for the sake of life only” (Aristotle). Explain. (15)
 - (c) Discuss the liberal views on feminism. (15)
3.
 - (a) Discuss J.S Mill’s notion of liberty. (20)
 - (b) Write the relevance of Gandhian ideas in the contemporary times. (15)
 - (c) Discuss the participatory model of democracy. (15)
4.
 - (a) “John Locke’s theory of right to private property is a justification for modern capitalism”. Elaborate. (20)
 - (b) Discuss the neo-Marxian perspective of Gramsci. (15)
 - (c) Explain the rules of power politics as given by Machiavelli. (15)

SECTION - B

5. Comments on the following in about 150 words each:- (5×10=50)
- (a) Write a short note on peasants and workers movements during India's freedom struggle. (10)
 - (b) Write down the salient features of Indian Constitution. (10)
 - (c) Elaborate the basic structure doctrine as articulated by Supreme Court of India. (10)
 - (d) Discuss the role of Parliament in law making process. (10)
 - (e) Mention three Contemporary challenges of the Panchayati Raj Institutions in India. (10)
6. (a) Rise of BJP represents another phase of "one party dominance system" in Indian politics. Discuss. (20)
- (b) Comment on the rising centralizing tendencies of Indian federalism. (15)
 - (c) Critically analyse the role of NITI Aayog. (15)
7. (a) Discuss Major social movements associated with environmental protection in India and their contributions. (20)
- (b) Discuss liberalization and economic reforms in the context of agriculture and farmers issues. (15)
 - (c) State the role of National Human Rights Commission in India. (15)
8. a) Examine the working of Coalition Politics in India since 1989. (20)
- (b) Discuss the success and failures of the Nehruvian model of development. (15)
 - (c) The provision of Directive Principles of State Policy is premised on making India a welfare state. Comment. (15)

CC(M)
PSYCHOLOGY
(OPTIONAL)
PAPER - I

[49]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

- i) *There are Eight questions divided in two Sections and printed in English. Candidate has to attempt **Five** questions in all. Questions No. 1 and 5 are compulsory and out of the remaining, any **Three** are to be attempted choosing at least One question from each Section. The number of marks carried by a question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer (QCA) Booklet in the space provided.*
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SECTION - A

1. Answer the following questions in about 150 words each. (5×10=50)
 - a) Describe the key ideas of Bronfenbrenner's ecological systems theory of human development. (10)
 - b) Elaborate on the criticisms of Piaget's theory of cognitive development. (10)
 - c) Critically evaluate Erikson's understanding of psychosocial development for adolescence particularly in the Indian context. (10)
 - d) Elucidate the advantages of the Signal Detection Theory over Classical Psychophysics. (10)
 - e) Discuss the assumptions and processes of doing regression analysis. (10)
2.
 - a) "The Principles of instrumental conditioning are deliberately used to shape human behaviour to achieve desirable results." Suggest any four operant conditioning techniques that are useful in the field of education, training and development and psychotherapy. (20)
 - b) Critically evaluate the psychoanalytic approach to personality. (15)
 - c) Discuss how psychoanalytic studies in India have challenged central tenets of psychoanalysis. (15)
3.
 - a) Discuss different types of psychological amnesias. (20)
 - b) *Multilinguals have better cognitive development than monolinguals and bilinguals.* Discuss. (15)
 - c) Differentiate between classical and constructivist grounded theory method of research. (15)
4.
 - a) Describe the PASS model of Intelligence. Discuss how is it different from the Triarchic Theory of Intelligence. (20)
 - b) Discuss how Seligman's experiments with dogs provide insight into depression and health behaviours. (15)
 - c) Discuss the theoretical basis and fundamental assumptions of MBTI. Evaluate it as a psychological test. (15)

SECTION - B

Answer the following questions in about **150 words** each:

(5×10=50)

5.
 - a) Discuss basic assumptions and characteristics of projective tests? **(10)**
 - b) Random sampling is called the Gold Standard of sampling. Discuss the merits and demerits of this sampling in Psychological Research. **(10)**
 - c) There has been an increased incidence of crowdfunding in recent years. Discuss this phenomenon in the light of the literature on prosocial behaviour. **(10)**
 - d) What are the characteristic features of indigenous healing systems practised in India? **(10)**
 - e) Discuss why are Erikson's stages of personality development known as 'psychosocial' instead of 'psychosexual' development? **(10)**
6.
 - a) You are researching on 'the role of play in the development of pro-social behavior among children'. Which method of data collection would you choose and why? **(20)**
 - b) "Most people are very poor at judging the effectiveness of their own learning." Comment on this statement in the light of research evidence on metamemory. **(15)**
 - c) Using suitable research examples, differentiate between survey and case study as research methods. **(15)**
7.
 - a) Before you calculate product-moment correlation coefficient in a correlational study, which underlying assumptions and requirements should you check for? **(20)**
 - b) Comment on the dark side of emotional intelligence. What is the role of emotional self-efficacy in stress management during the times of the COVID-19 pandemic? **(15)**
 - c) Discuss Murray's Theory of Needs with suitable examples. **(15)**
8.
 - a) Discuss the importance of heredity and environment in the development of intelligence. **(20)**
 - b) Which theory of human development focuses on the role of culture in cognitive development? Explain its basic tenets. **(15)**
 - c) What are the key differences between Freudian dream analysis and Jungian dream analysis? **(15)**

CC(M)
SOCIOLOGY
(OPTIONAL)
PAPER - I
(53)

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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- vi) *No blank page be left in between answer to various questions.*

SECTION - A

1. Answer the following questions in about 150 words each. (5×10=50)
- a) What are the factors that led to the emergence of Sociology in the West? Trace the origins of the discipline in Europe. (10)
 - b) Sociology as compared to common sense is not limited by time and space. Comment. (10)
 - c) Compare Sociology and Social Anthropology as academic disciplines. (10)
 - d) Explain Max Weber's theory of social action. (10)
 - e) Describe the concept of intersectionality with illustrations from gender and caste. (10)
2. a) Is Sociology a Science? Explain with reference to Sociological theories. (20)
- b) Discuss the role of education in Social Change. (15)
 - c) Discuss the importance of gender and ethics in research. Illustrate with examples. (15)
3. a) Explain the dialectical approach to the study of history of society. (20)
- b) Discuss Robert Merton's approach to the study of society. (15)
 - c) Explain the concepts of mind, self and society with reference to Mead. (15)
4. a) What are social facts? Explain with reference to Durkheim. (20)
- b) Describe Weber's approach to stratification in society. (15)
 - c) Discuss the scientific method of enquiry. (15)

SECTION - B

5. Answer the following questions in about 150 words each. (5×10=50)
- a) What are the different types of family? (10)
 - b) What is a social movement? Illustrate with the help of any one social movement in India. (10)
 - c) Explain Andre Gunder Frank's theory of development. (10)
 - d) Explain the relationship between religion and economy in the context of emergence of capitalism. (10)
 - e) What are sects and cults? Illustrate your answer with examples. (10)

6. a) Describe race and ethnicity as forms of social stratification. (20)
b) Explain the concept of social mobility with reference to India. (15)
c) Explain the symbolic interactionist perspective to the study of society. (15)
7. a) Explain gender as a form of stratification. (20)
b) Describe the concept of power elite. (15)
c) Sociological theory was essentially androcentric during its period of emergence. Comment. (15)
8. a) How is work organized in a technologically simple society? Illustrate with examples. (20)
b) Explain Durkheim's approach to the study of religion. (15)
c) How is social equilibrium maintained in society. Discuss with reference to Talcott Parsons. (15)
-

CC(M)
ZOOLOGY
(OPTIONAL)
PAPER - I
[57]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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SECTION -A

1. Answer the following in about 150 words each :
 - a) Describe different kinds of coral reefs on the basis of their formation. (10)
 - b) Describe altruism with the help of any two examples. Why was it difficult for Darwin to explain this phenomenon in context of natural selection. (10)
 - c) Describe the stages of metamorphosis in hemimetabolous and holometabolous insects. Add a note on the role of hormones in their metamorphosis regulation. (10)
 - d) What is thermal pollution? Describe its sources and causes and elaborate its effect on aquatic biodiversity. (10)
 - e) Give the affinities and systematic position of *Branchiostoma*. (10)
2.
 - a) Name the defensive organ in Cnidarians and describe its structure. Add a note on its mechanism of action. (20)
 - b) Explain the statement that "an animal's nitrogenous wastes reflect its phylogeny and habitat". What advantage does uric acid offer as a nitrogenous waste in arid environment? (15)
 - c) Describe the stages of ecological succession in a terrestrial ecosystem. Give two examples of how presence of wild animals change the process of succession. (15)
3.
 - a) Describe the biology of the malignant tertian malaria parasite *Plasmodium falciparum* (including the human and vector stages). Explain why malaria caused by *P. falciparum* is more lethal than the other human malarial parasites? (20)
 - b) Draw labelled diagrams of Echinoderm larval forms. Add a note on their evolutionary significance. (15)
 - c) Differentiate between Innate and learnt behavior. Explain why reward, and not punishment, is a better way to reinforce a certain behaviour. (15)
4.
 - a) Give a brief account of the sulphur cycle. Comment on its importance in the ecosystem. State the effect of chlorofluorocarbons on the climate change. (20)
 - b) Give an account of evolution of aortic arches in reptile, birds and mammals. (15)
 - c) What are the three regions of the adrenal cortex and what hormones do they produce? Describe the role of negative feedback in the function of the parathyroid gland. (15)

CC(M)
KASHMIRI
PAPER - I
[30]

Time Allowed - 3 Hours

Maximum Marks - 250

(Answer Must be written in kashmiri)

- جواب دینہ برو نہہ پُرسوالن متعلق خاص ہدایات۔
- ۱۔ بیتھ پرچس منز چھ اٹھ سوال یم دون حصن (سیکشنن) پیٹھ مشتمل چھ۔
 - ۲۔ توہہ چھ گل پانژن سوالن ہند د جواب دہ۔
 - ۳۔ سوال نمبر 1 (اکھ) تہ سوال نمبر 5 (پانژک) جواب دین چھ لازمی۔
 - ۴۔ دو یوسیکشنو منز چھ باقی ترہن سوالن ہند جواب دین۔ مگر پڑتھ سیکشن کو سوالو منز چھ کم کھوتہ کم اکھ سوالک جواب دین ضروری۔ پڑتھ سوالس تہ سوالکس حصس برو نہہ کنہ چھ (Marks) درج کرنہ آئتر۔
 - ۵۔ سوالن ہند جواب دینہ باپتھ چھ الفاظن ہند تعداد مقرر کرنہ آئتر۔ انچ پابندی کرنہ چھ لازمی۔
 - ۶۔ سوالن ہند ہن جوابن پیہ ترتیب وار اہمیت دینہ۔
 - ۷۔ اگر کنہ سوالک یا تمکلمہ کنہ حصک لکھنہ آئتر جواب تہو مجرا چھونہ یڑھان تھاؤن، تھ گڑھ کراس دین۔ نپہ پیہ سہ جواب تصور کرنہ، ید وے سہ جواب اڈلیو گئے تہ آسہ۔
 - ۸۔ کانہہ صفحہ یا صفحک کانہہ حصہ اگر خالی روز، تھ گڑھ کراس دین۔

SECTION - A

1. یمن پڑھ لکھو نوٹ۔ (پڑتھ سوالگ جواب 100 الفاظن منز)
- (50)
- (10) (الف) سوالہ جملہ۔
- (10) (ب) صوتی بولن تان۔
- (10) (ج) جملیات۔
- (10) (د) ڈکھہ کراؤت۔
- (10) (ه) صوتیم تہ امکو قسم۔

2. یمن سوالن ہند جواب لکھو۔
- (50)
- (20) (الف) کائثر زبانی ہند نسبی رشتہ۔ (200 الفاظن منز)
- (20) (ب) کائثر زبانی متعلق گریرن ہنر راے۔ (200 الفاظن منز)
- (10) (ج) کائثرس منز علاقہ وار بولن ہند پھیر۔ (100 الفاظن منز)

3. یمن سوالن ہند جواب لکھو۔
- (50)
- (20) (الف) مصوۃ کیاہ گو و تہ امکو قسم۔ (200 الفاظن منز)
- (20) (ب) کیفیہ بدلاؤ کئی کم صوتیمی تبدیلیہ چھہ کراؤتی ترکیبہ منز یوان؟ (200 الفاظن منز)
- (10) (ج) کائثرس منز اشارہ ناؤت۔ (100 الفاظن منز)

4. یمن سوالن ہند جواب لکھو۔
- (50)
- (20) (الف) کائثرین جملن منز حالت یا کیس۔ (200 الفاظن منز)
- (20) (ب) جملہ واٹون - حوالہ ناؤتے۔ (200 الفاظن منز)
- (10) (ج) سا د جملہ۔ (100 الفاظن منز)

SECTION - B

5. یمن پڑھ لکھو نوٹ۔ (پڑتھ سوالک جواب۔ 100 الفاظن منز) (50)

(10) (الف)۔ شیخ العالم تہ ریشت۔

(10) (ب)۔ للہ واھ۔

(10) (ج)۔ غزل

(10) (د)۔ مثنوی۔

(10) (ه)۔ ترقی پسندی۔

6. یمن سوالن ہند جواب لکھو۔ (50)

(20) (الف)۔ ل دید ہنز شاعری ہند فکری پوت منظر۔ (200 الفاظن منز)

(20) (ب)۔ شیخ شکر کین منز شیخ العالمنہ زما نکو سما جی عکس۔ (200 الفاظن منز)

(10) (ج)۔ شکر کین تہ واھن در میان ہشر۔ (100 الفاظن منز)

7. یمن سوالن ہند جواب لکھو۔ (50)

(20) (الف)۔ حبہ خاتونہ ہند وژن اوس روایتی شاعری نشہ مختلف۔ (200 الفاظن منز)

(20) (ب)۔ کاشر مثنوی محمود گامی سند دیوت۔ (200 الفاظن منز)

(10) (ج)۔ رسول میرن اذن کاشر س غزلس منز نوہر۔ (100 الفاظن منز)

8. یمن سوالن ہند جواب لکھو۔

(50)

(20)

(الف) عبدالاحد آزاد نے شاعری پڑھ ترقی پسندی ہند اثر۔ (200 الفاظن منز)

(20)

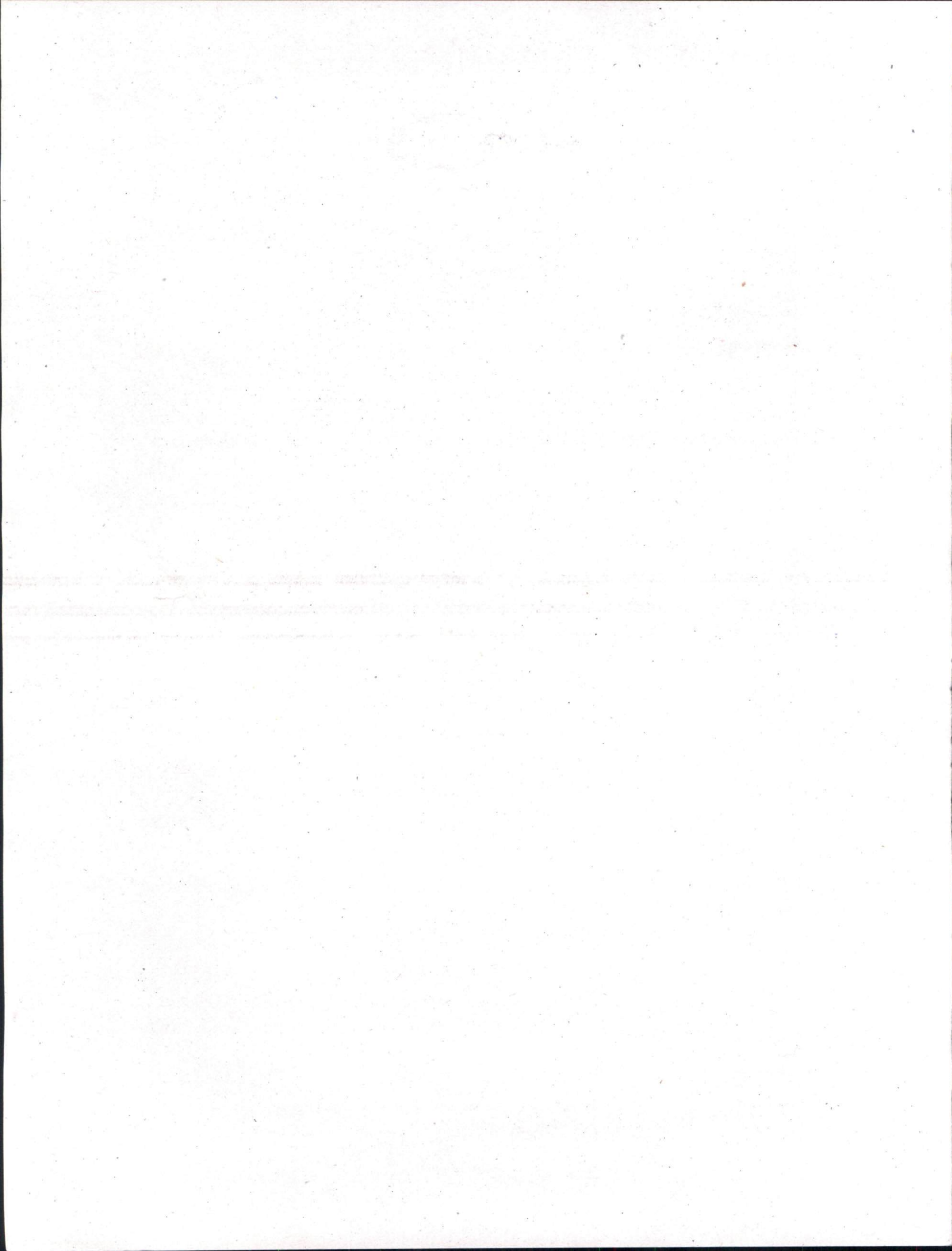
(ب) کاشتر افسانہ بارسس پنکو محرکات۔ (200 الفاظن منز)

(10)

(ج) کاشتر ناولگ ابتداء تہ ارتقاء۔ (100 الفاظن منز)

SECTION - B

5. Answer the following in about 150 words each :
- a) Define "insight". Explain insight behavior using the examples of Chimpanzees. (10)
 - b) What is fish migration? Describe it's causes. Discuss the migration of catadromous and anadromous fishes. (10)
 - c) What is Red Data book? Which organisation established it? Name the categories in which animals are divided into, in the Red Data book and give one example of animals in each category. (10)
 - d) Give economic importance of Apiculture and Pearl culture. (10)
 - e) Describe FISH and Chromosome painting. (10)
- 6.
- a) Give an account of the causes and consequences of pollution of freshwater resources and the problem of Eutrophication. Suggest measures for abatement of aquatic resource degradation. (20)
 - b) Write systemic position of any three pests of stored grain. Describe the life cycle, nature of damage and management of *Sitophilus oryzae*. (15)
 - c) Innate and adaptive immunity act in cooperative and interdependent ways to protect the host. Discuss the collaboration of these two forms of immunity in various groups of animals. (15)
- 7.
- a) What do you mean by biostatistics? Differentiate between one-way and two-way ANOVA. Comment on its application in biological research. (20)
 - b) What is sign-stimuli? Mention various types of sign stimulus and discuss its importance with suitable examples. (15)
 - c) Define biodiversity hot-spots and mention the criteria of its selection. Write biodiversity hot-spots of the Indian region giving their salient features. (15)
- 8.
- a) Explain the principle, its components, and limitations of Scanning and Transmission Electron Microscopy, Add note on a negative staining and application. (20)
 - b) What are "transgenic animals" Describe the three important transgenic aquaculture animals. Comment on merits and demerits of transgenic animals. (15)
 - c) What do you understand by Remote sensing? Explain how it can be used as an effective tool for biodiversity studies and sustainable development. (15)



CC(M)

MECHANICAL ENGINEERING

(OPTIONAL)

PAPER - I

[39]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

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- iv) *Diagrams/Figures, wherever required shall be drawn in the space provided for answering the question itself.*
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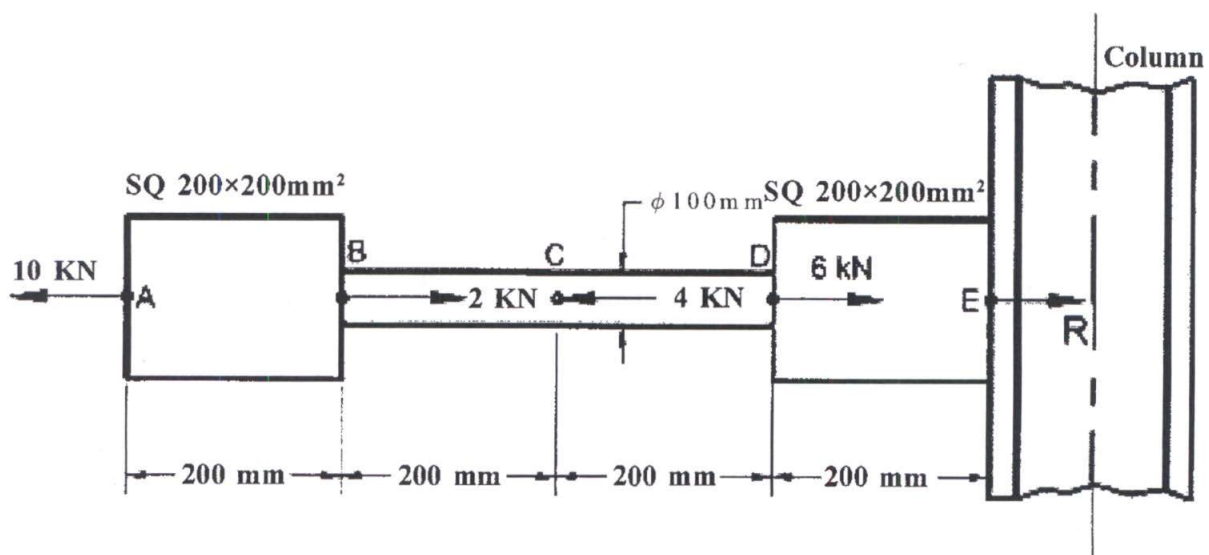
SECTION - A

1. Answer the following in about 150 words each :

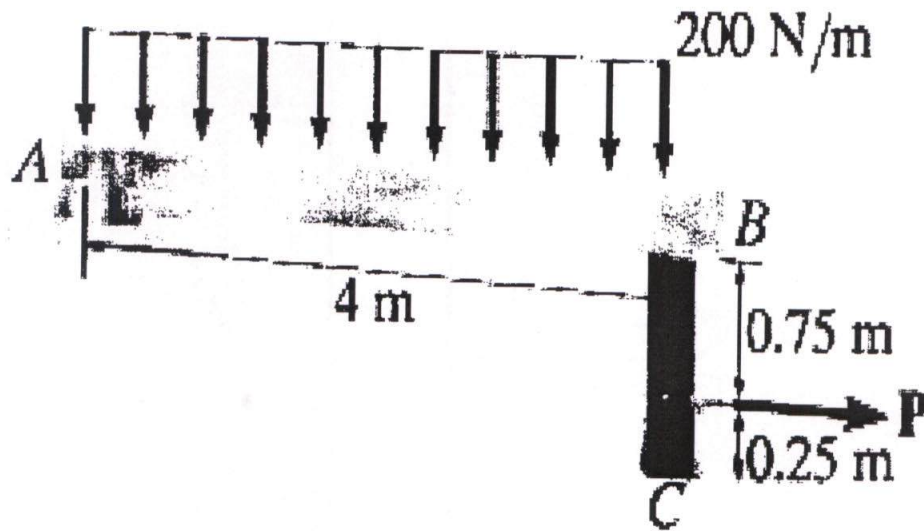
- a) In a small displacement plane strain problem, the strain components in a machine part, relative to axes (x, y, z) are $\varepsilon_{xx} = A(L - x)$, $\varepsilon_{yy} = B(L - x)$, $\varepsilon_{xy} = 0$. Determine the displacement components (u, v) for the case where the displacement components (u, v) vanish at $x=y=0$ and the slopes $\left(\frac{\partial u}{\partial y}, \frac{\partial v}{\partial x}\right)$ are equal at $x=y=0$. A and B are constants. (10)

- b) The bar is attached to a column at its right end and loaded as indicated in Figure below. (10)

- i. Draw a free body diagram of the bar.
- ii. Find the reaction R required to maintain the equilibrium.
- iii. Sketch axial force and stress variation along the axial length.

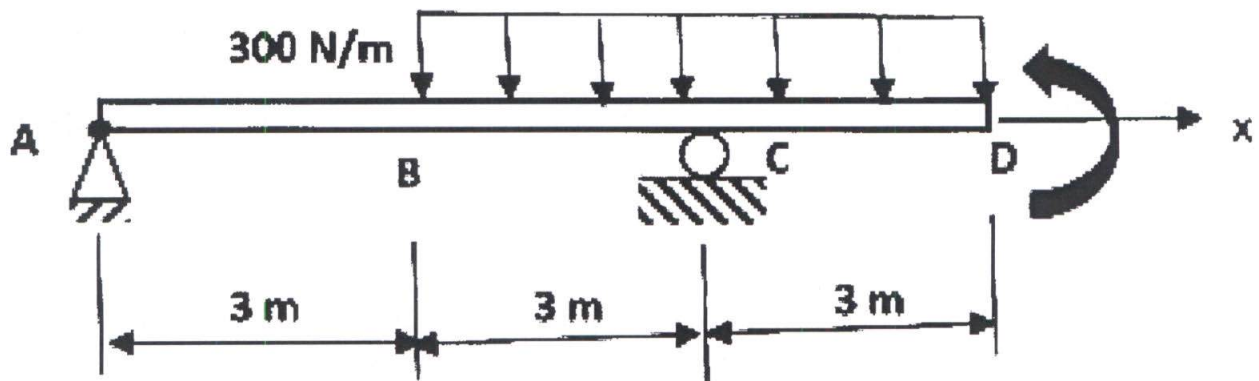


- c) Beam AB is subjected to a uniform load of 200 N/m and A is at ground and B is supported at a post BC, as shown in Figure below. If the coefficients of static friction at B and C are $\mu_B = 0.2$ and $\mu_C = 0.5$, respectively. Determine the force P needed to pull the post out from under the beam. Neglect the weight of the members and the thickness of the beam. (10)

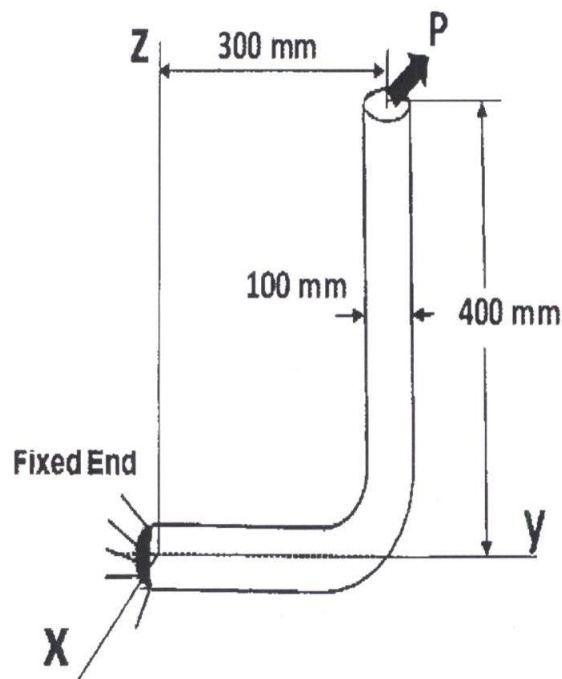


- d) Draw the failure envelope in $(\sigma_1 - \sigma_2)$ plane for a unidirectional lamina based on the Maximum Strain failure theory. The material parameters for the lamina are as follows : $E_1 = E_2 = 10\text{GPa}$; $\eta_{12} = 0.5\text{GPa}$; $\nu_{12} = \nu_{21} = 0.5$; $(\sigma_1^T)_{ult} = (\sigma_1^C)_{ult} = (\sigma_2^T)_{ult} = (\sigma_2^C)_{ult} = 1\text{GPa}$; $(\tau_{12})_{ult} = 0.5\text{GPa}$ where η is the shear modulus, E is Young's modulus and ν is the Poisson ratio. Whereas subscripts 1 and 2 are referring to in-plane directions of the lamina, and T and C correspond to ultimate tensile and compressive strengths, respectively. (10)
- e) The tensorial strain components at a point in a body are given by $\epsilon_x = 100\mu$; $\epsilon_y = 50\mu$; $\epsilon_z = 40\mu$; and $\epsilon_{xy} = 10\mu$; $\epsilon_{yz} = 5\mu$; $\epsilon_{zx} = 7.5\mu$. Calculate the resultant, normal and shearing strain on a plane whose normal has the direction cosines $(\frac{1}{\sqrt{3}}, \frac{\sqrt{2}}{3}, 0)$. (10)

2. a) A beam AC is simply supported at A and C. It is subjected to uniformly distributed load of 300 N/m plus the couple of magnitude 2700 N-m as shown in Figure below. Describe the shear force and bending moment along-x and plot the shear force and bending moment diagrams. (20)



- b) A 100 mm diameter bar as shown in the figure below is made of a ductile steel having a yield stress $S_y = 620$ MPa. The free end of the bar is subjected to a load P making equal angles with the positive directions of the three coordinates axes. Using the *vonMises failure criterion*, determine the magnitude of P that will initiate yielding (15)



c) The stress components acting at a point are expressed as:

(15)

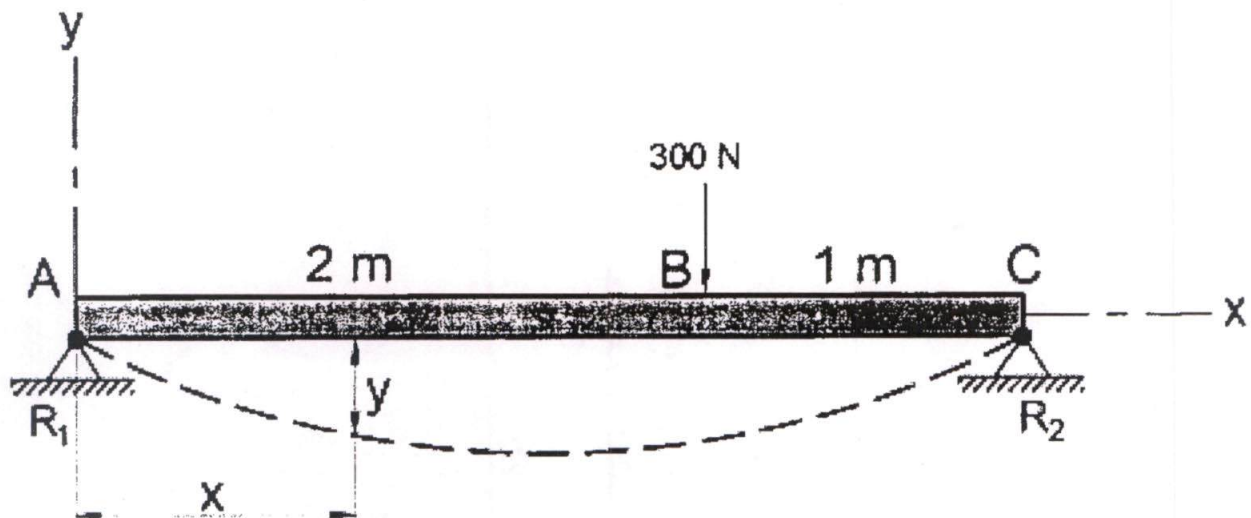
$$\sigma_{ij} = \begin{bmatrix} -10 & 0 & -5 \\ 0 & 2 & 0 \\ -5 & 0 & 2 \end{bmatrix} \text{MPa}$$

Determine the following:

- i. The principal stresses
- ii. The octahedral shear stress
- iii. The maximum shear stress

3. a) A concentrated load of 300 N is acting at point B as shown in Figure below. Derive the equations of the elastic curve between each change of load point and determine the maximum deflection in the beam. (20)

Take $E = 10 \text{ GPa}$, $I = 1.5 \times 10^{-6} \text{ m}^4$

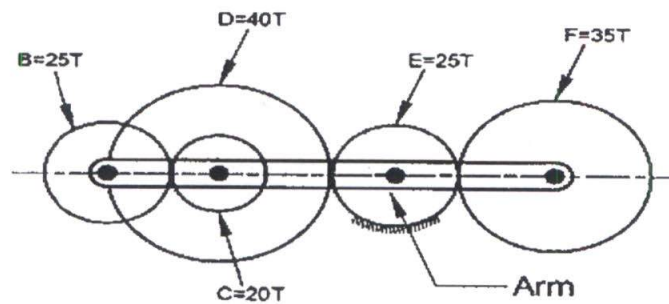


- b) An epicyclic gear train is shown in Figure (a) below which consist of fixed gear E. The gears C and D are integrally cast and form a compound gear. The teeth on each gear are indicated in the Figure. (15)

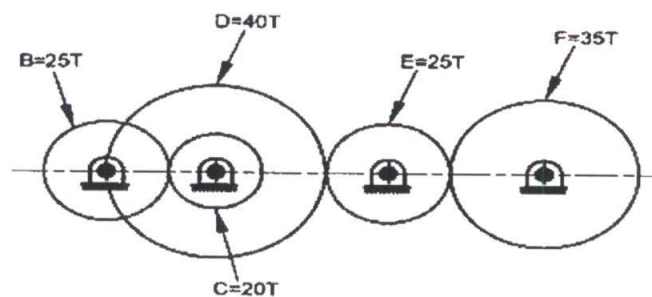
Compute the following:

- i. If arm A makes one revolution per second in CCW, determine the speed and direction of rotation of gears B and F as well the velocity ratio of gear F to gear B.

- ii. Compare the velocity ratio $\left(\frac{\omega_F}{\omega_B} \right)$ of epicyclic gear train shown in Figure (a) to that of the gear train in Figure (b) i.e. if gear E is released.

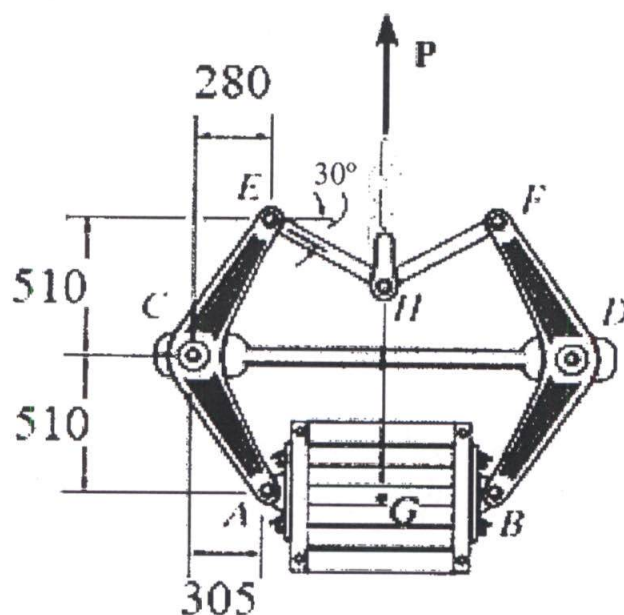


(a)



(b)

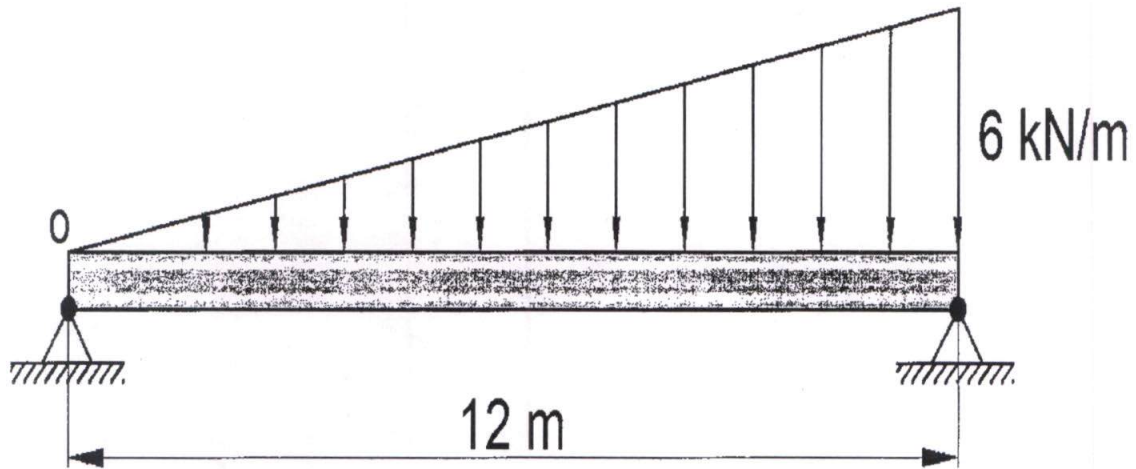
- c) The tongs are used to lift the 200-kg crate whose center of mass is at G as shown in Figure below. Determine the least coefficient of static friction at the pivot blocks (A and B) so that the crate can be lifted. (15)



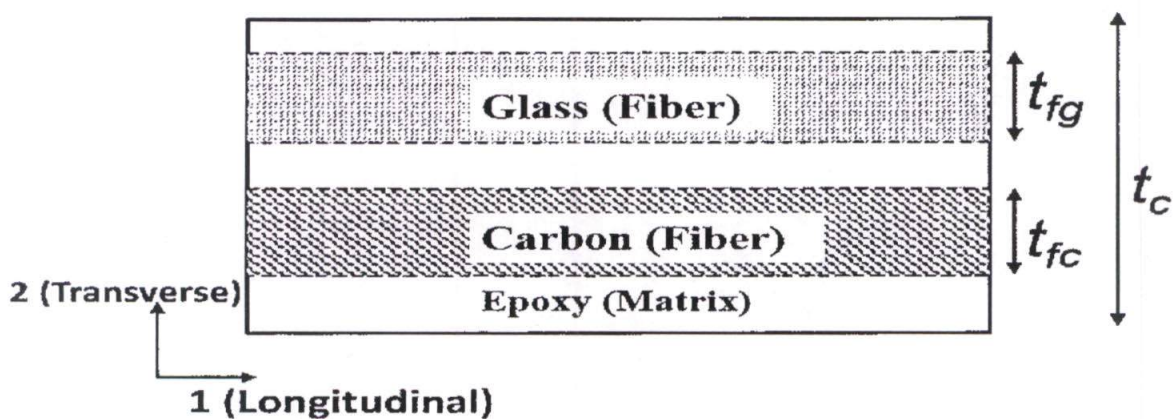
[All dimensions are in mm]

(6)

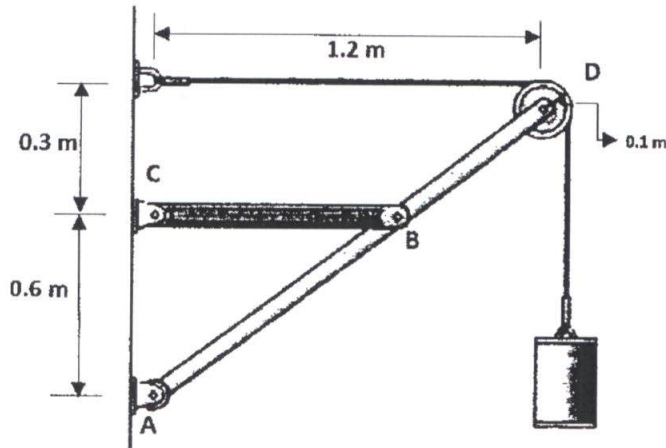
4. a) A Triangularly loaded beam is shown in Figure below. Draw the shear Force and bending moment diagrams. Determine the value of maximum bending moment. (20)



- b) A hybrid unidirectional lamina consists of carbon fiber, glass fiber and epoxy matrix. Derive the expression for the longitudinal elastic modulus (E_1) of the lamina based on the rectangular block model as shown in the Figure below. Assuming that V_{fc} , V_{fg} and V_m are the volume fractions of carbon fiber, glass fiber and epoxy matrix, respectively. Five elastic constants for the transversely isotropic carbon fiber are: $E_{1,fc}$, $E_{2,fc}$, $\nu_{12,fc}$, $G_{12,fc}$ and $\nu_{23,fc}$. The two elastic constants for the isotropic glass fiber E_{fg} and ν_{fg} , and the isotropic epoxy matrix are E_m and ν_m respectively. (15)

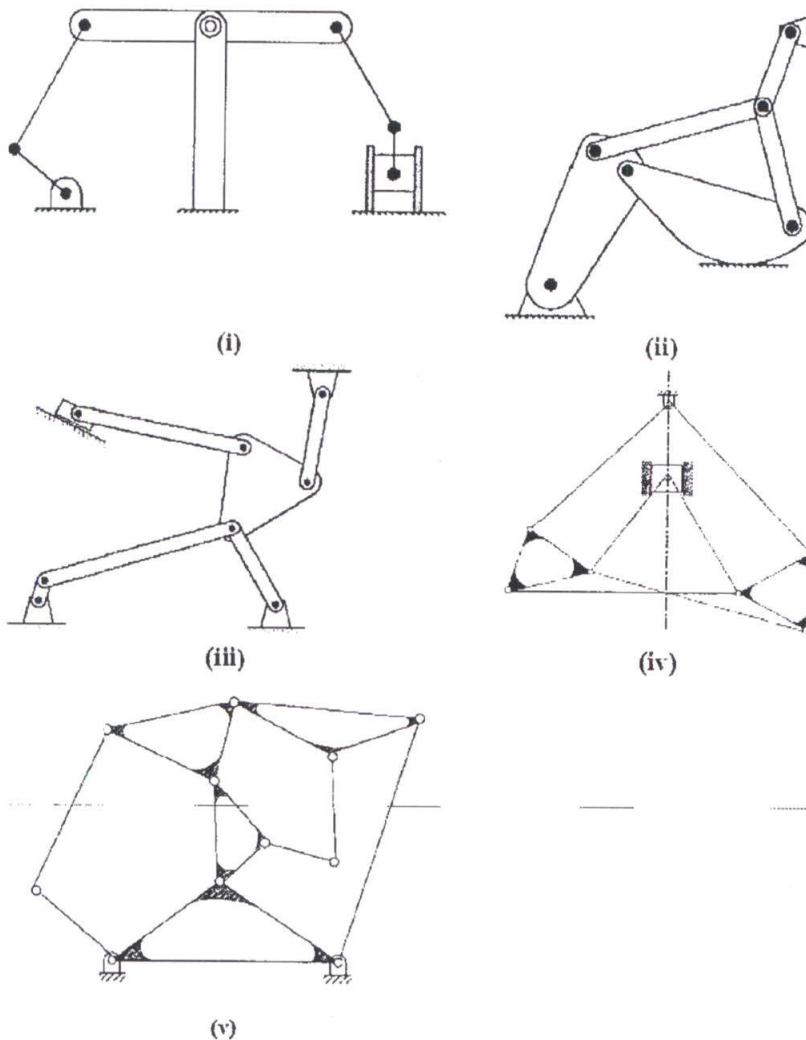


- c) The frame as shown in the Figure below supports 50-kg cylinder. Determine the horizontal and vertical components of reaction at A and the force at C. (15)



SECTION - B

5. a) The following Figure shows a group of linkages. Determine the Degree of Freedom (D.O.F.) of each linkage. Show all the intermediate steps i.e. number of links, number of pairs, number of multiple turning joints (if any). (10)

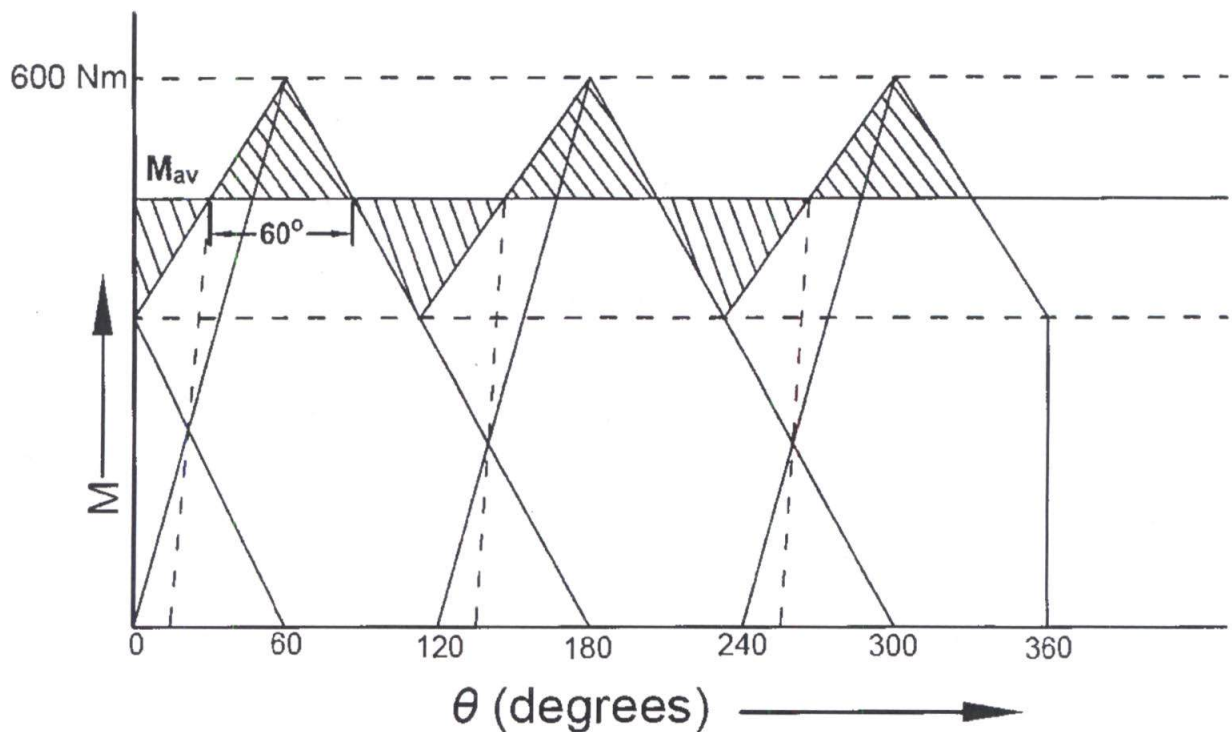


- b) A person wants to invest up to an amount of Rs. 30,000 in fixed income securities. His broker recommends investing in two Bonds: Bond A yielding 7% and Bond B yielding 10%. After some consideration, he decides to invest at most Rs. 12,000 in bond B and at least Rs. 6,000 in Bond A. He also wants the amount invested in Bond A to be at least equal to the amount invested in Bond B. What should the broker recommend, if the investor wants to maximize his return on investment? Formulate the problem as a linear programming model and solve it graphically. (10)
- c) Write a part program using G and M codes to drill two holes of same diameter (following the path O-A-B-O) in a plate as shown in the following figure. The selected values for spindle speed, feed and tool number are 1000, 200, 002 (with usual units, if applicable), respectively. Use the absolute mode of dimensioning. (10)

[All dimensions are in mm]

6. a) A three cylinder two-stroke engine has its cranks 120° apart as shown in Figure below, the resultant diagram is shown which has shaded areas. The speed of the engine is 600rpm. The turning moment diagram for each cylinder can be represented by a triangle for one expansion stroke with a maximum value of turning moment produced 600 Nm at 60° from the top dead centre (TDC). The turning moment in other stroke is zero for all the cylinders. Determine the following: (20)

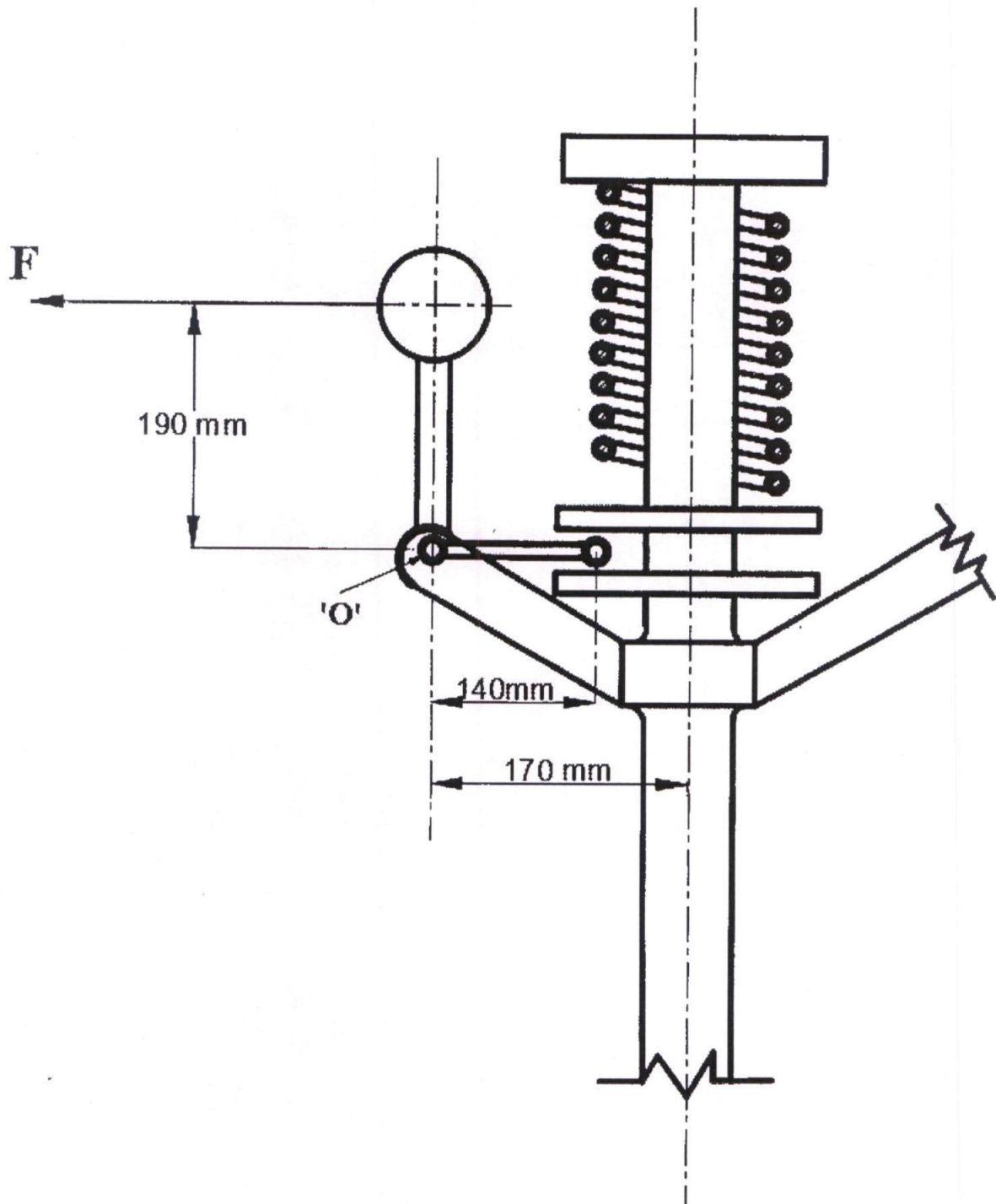
- The power developed by the engine.
- The coefficient of fluctuation of speed with a flywheel having mass 10 kg and radius of gyration equal to 500 mm.
- The coefficient of fluctuation of energy.
- The maximum angular acceleration of the flywheel.



- b) A Hartnell governor is shown in Figure below. The length of bell arm is 190 mm, that of the sleeve arm 140 mm, and mass of each ball is 2.7 kg. The distance of the pivot of each bell crank lever from the axis of rotation is 170 mm, and the speed when the bell arm is vertical, is 300 rpm. The speed is to increase 0.6% for a lift of 12mm of the sleeve. (15)

- Neglecting the dead load on the sleeve, determine the required stiffness of the spring and initial compression.

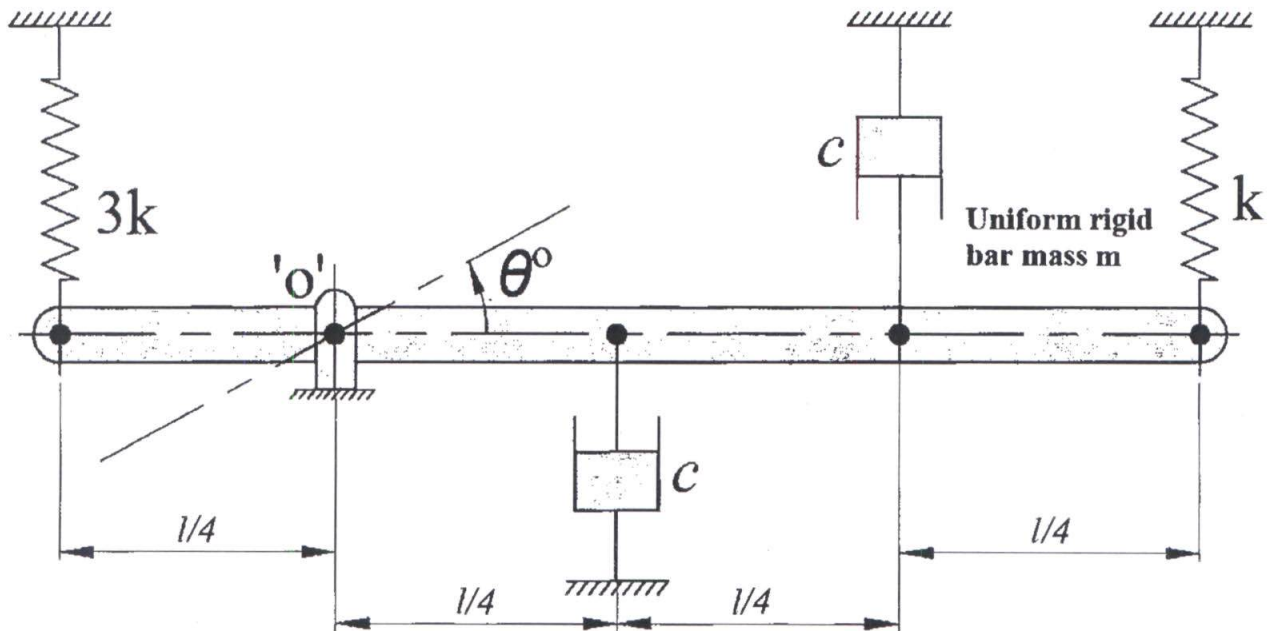
- ii. What spring stiffness and initial compression would be required if the speed is to remain the same for the changed position of the sleeve (i.e. the governor is to be isochronous)?



- c) A vibratory system is shown in Figure below. Assuming small oscillations, determine the following: (15)
- i) Natural frequency.

- ii) Response of the system, if it is subjected to initial conditions i.e. $\theta = \theta_0$ and $\dot{\theta} = 5 \text{ rad/sec}$ at $t=0$.

[Take $J_o = \frac{7}{48} ml^2$]



7. a) In orthogonal machining, the tool has rake angle 10° , chip thickness before cut is 0.02 mm , and chip thickness after cut is 0.04 mm , width of cut $= 2 \text{ mm}$. The cutting and thrust forces are measured as 350 N and 285 N , respectively. Using Merchant circle diagram, determine: (20)

(i) The value of shear stress,

(ii) The percentage change in the shear stress, if the width of cut is changed from 2 mm to 4 mm and rest all conditions remain the same.

- b) Five jobs (1, 2, 3, 4, and 5) are to be processed on five machines (A, B, C, D, and E). Any machine can process any job. The profit of each job allocation to each machine is given in the following table. Allocate the jobs to machines with an objective to maximize the profit. (15)

		Machines				
		A	B	C	D	E
Jobs	1	40	37	36	21	40
	2	35	24	28	28	37
	3	27	25	33	30	36
	4	34	34	33	40	39
	5	43	30	42	37	38

- c) Four components are used to make a product. These components are processed in four steps called operations (A, B, C, D). The precedence operation and time required for each operation in preparing the product assembly is given in the Table below. Demand will be fulfilled if company produces 4000 products in a week. Plant will run Monday to Friday with 8 hours working per day in a week. Design suitable number of work stations to meet the production target, without violating any constraints. Also, draw the arrangement of workstations. (15)

Operation	Operation time	Precedence Operation
A	0.1 min	-
B	0.2 min	A
C	0.4 min	A
D	0.3 min	B,C

8. a) A cylindrical cup (without any flange) is to be drawn from 2.5 mm thick sheet. The final dimensions of the cup so produced has 14 mm diameter and a height of 45 mm. Assuming no variation in the thickness of sheet during drawing operation and the reduction ratio in first and subsequent draw not to exceed 35% and 20%, respectively. Determine the initial blank diameter and the number of draws required to obtain the final dimensions of the cup. (20)

- b) Consider the following data of an asset : (15)

Cost of the asset	Rs. 120,000
Useful life	5 years
Salvage value	Rs. 30,000

Compute the annual depreciation allowances and resulting book values, using the following methods.

- i. The straight-line method
 - ii. The 150% declining-balance method
- c) A company's necessary information for producing five products at one of its workstation situated in North India is given in the table below. In the next four weeks, one product at a time will be processed. Calculate production sequence, inventories and run-out time for each product in each week. (15)

Product	1	2	3	4	5
Available inventory	100	40	10	600	500
Production/Week	150	100	240	500	250
Demand/Week	30	15	20	150	50
Lot size	150	100	240	500	250

CC(M)
HINDI
PAPER - I
[28]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instruction carefully before attempting questions.

- i) There are **EIGHT** questions divided in two Sections and printed in **HINDI**.
- ii) Candidate has to attempt **FIVE** questions in all.
- iii) Questions No. 1 and 5 are compulsory and out of the remaining, **THREE** are to be attempted choosing at least **ONE** question from each Section.
- iv) The number of marks carried by a question/part is indicated against it.
- v) Answers must be written in the medium authorized in the Admission Certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in a medium other than the authorized one.
- vi) Word limit in questions, wherever specified, should be adhered to.
- vii) Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

1. किन्हीं तीन विषय पर आलोचनात्मक टिप्पणी लिखिए। (20+15+15)
 - (क) देवनागरी लिपि का मानक स्वरूप
 - (ख) तकनीकी की भाषा के रूप में हिंदी का योगदान
 - (ग) अमीर खुसरो की काव्य-भाषा
 - (घ) भाषा और बोली में अंतर बताते हुए हिंदी भाषा के निर्माण में बोलियों के योगदान पर चर्चा कीजिए।
 - (ङ) राजभाषा हिंदी का वर्तमान स्वरूप
2. (क) अपभ्रंश और आरंभिक हिंदी के व्याकरणिक स्वरूप को स्पष्ट करते हुए आरंभिक हिंदी की ध्वनिगत और रूपगत विशेषताएँ बताइए। (20)
 - (ख) अवधी की उत्पत्ति और उसके विकास पर प्रकाश डालिए। (15)
 - (ग) मानक हिंदी की व्याकरणिक विशेषताएं लिखिए। (15)
3. (क) मध्यकालीन काव्य-भाषा के रूप में ब्रज-भाषा के साहित्यिक अवदान का विश्लेषण कीजिए। (20)
 - (ख) दक्खिनी हिंदी की साहित्यिक विशेषताओं का उल्लेख कीजिए। (15)
 - (ग) 'हिंदी आज संपर्क साधने की भाषा के रूप में विकसित हो रही है।' कथन के आलोक में अपना पक्ष सोदाहरण स्पष्ट कीजिए। (15)
4. (क) पश्चिमी हिंदी की किन्हीं दो बोलियों का संक्षिप्त परिचय दीजिए। (20)
 - (ख) स्वाधीनता आंदोलन में राष्ट्रभाषा के रूप में हिंदी के योगदान पर विचार कीजिए। (15)
 - (ग) हिंदी की संवैधानिक स्थिति पर विचार कीजिए। (15)

5. किन्हीं तीन विषय पर आलोचनात्मक टिप्पणी लिखिए। (20+15+15)
- (क) प्रेमचंद युगीन उपन्यासों का सामाजिक यथार्थ
- (ख) रीतिकाव्य की धर्मनिरपेक्षता
- (ग) नाटककार जयशंकर प्रसाद
- (घ) समकालीन कविता की प्रमुख प्रवृत्तियाँ
- (ङ) कृष्णा सोबती की कथा-भाषा
6. (क) आदिकाल के काल निर्धारण-नामकरण की समस्या का आलोचनात्मक परीक्षण कीजिए। (20)
- (ख) भक्ति साहित्य के सामाजिक-सांस्कृतिक प्रदेय का आलोचनात्मक मूल्यांकन कीजिए। (15)
- (ग) हिंदी यात्रा वृत्तांत के विकास में अज्ञेय के यात्रावृत्तांतों के साहित्यिक अवदान पर विचार कीजिए। (15)
7. (क) विद्यापति की कविताओं में व्यक्त भक्ति व श्रृंगार के स्वरूप का सोदाहरण विवेचन कीजिए। (20)
- (ख) निर्गुण और सगुण काव्यधारा में व्यक्त साम्य-वैषम्य को रेखांकित कीजिए। (15)
- (ग) 'हिंदी आलोचना के विकास में आचार्य रामचंद्र शुक्ल का योगदान अक्षुण्ण है।' इस कथन पर विचार करते हुए अपना मत प्रस्तुत कीजिए। (15)
8. (क) नवजागरण के संदर्भ में भारतेन्दु युगीन साहित्य का मूल्यांकन कीजिए। (20)
- (ख) उत्तर छायावादी काव्य की प्रमुख प्रवृत्तियों को सोदाहरण स्पष्ट कीजिए। (15)
- (ग) रेखाचित्र और संस्मरण के स्वरूप को स्पष्ट करते हुए दोनों में अंतर बताइए। (15)

CC(M)

PUNJABI

PAPER - I

[34]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper

- i) *There are eight questions divided in two Sections and printed in English. Candidate has to attempt **Five** questions in all. Questions No. 1 and 5 are compulsory and out of the remaining, any **Three** are to be attempted choosing at least One question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer(QCA) Booklet in the space provided.*
- ii) *Your answer should be precise and coherent.*
- iii) *If you encounter any typographical error, please read it as it appears in the text book.*
- iv) *Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.*
- v) *No continuation sheets shall be provided to any candidate under any circumstances.*
- vi) *No blank page be left in between answer to various questions.*

SECTION -A

1. ਪ੍ਰਸ਼ਨ

(5×10=50)

- (ੳ) ਦੁੱਤ ਵਿਅੰਜਨ ਕੀ ਹੁੰਦੇ ਹਨ ? (10)
- (ਅ) ਪੰਜਾਬੀ ਸਵਰ ਧੁਨੀਆਂ ਦਾ ਵਰਗੀਕਰਨ ਕਰੋ । (10)
- (ੲ) ਤਤਸਮ ਅਤੇ ਤਦਭਵ ਸ਼ਬਦਾਂ ਤੋਂ ਕੀ ਭਾਵ ਹੈ ? ਉਦਾਹਰਨਾਂ ਸਾਹਿਤ ਦੱਸੋ । (10)
- (ਸ) ਭਾਸ਼ਾ ਅਤੇ ਉਪਭਾਸ਼ਾ ਵਿਚ ਨਿਖੇੜਾ ਕਰੋ । (10)
- (ਹ) ਸੂਫੀ ਕਵਿਤਾ ਦੀਆਂ ਚਾਰ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਦੱਸੋ । (10)

2. ਪ੍ਰਸ਼ਨ

- (ੳ) ਰੂਪ ਗ੍ਰਾਮ ਦੀ ਪਰਿਭਾਸ਼ਾ ਦੇਂਦੇ ਹੋਏ ਇਸ ਦੀਆਂ ਪ੍ਰਮੁੱਖ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ 'ਤੇ ਚਾਨਣਾ ਪਾਉ । (20)
- (ਅ) ਮਾਝੀ ਉਪਭਾਸ਼ਾ ਦਾ ਖੇਤਰ ਦੱਸਦੇ ਹੋਏ ਇਸ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਦੱਸੋ । (15)
- (ੲ) ਗੁਰਮਤਿ ਕਾਵਿ ਦੀਆਂ ਚਾਰ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਦੱਸੋ । (15)

3. ਪ੍ਰਸ਼ਨ

- (ੳ) ਗੁਰਮੁਖੀ ਲਿਪੀ ਬਾਰੇ ਚਰਚਾ ਕਰਦੇ ਹੋਏ ਦੱਸੋ ਕਿ ਇਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਲਈ ਕਿਵੇਂ ਢੁਕਵੀਂ ਹੈ ? (20)
- (ਅ) ਪੰਜਾਬੀ ਕਿੱਸਾ ਕਾਵਿ ਦੇ ਆਰੰਭ ਦੀ ਚਰਚਾ ਕਰਦੇ ਹੋਏ ਇਸ ਦੇ ਵਿਕਾਸ 'ਤੇ ਚਾਨਣਾ ਪਾਉ । (15)
- (ੲ) ਪੰਜਾਬੀ ਵਾਕ ਵਿਚ ਕਰਤਾ ਅਤੇ ਕਰਮ ਸੰਬੰਧੀ ਉਦਾਹਰਨਾਂ ਸਾਹਿਤ ਜਾਣਕਾਰੀ ਦਿਉ । (15)

4. ਪ੍ਰਸ਼ਨ

- (ੳ) 1947 ਦੀ ਦੇਸ਼ ਵੰਡ ਤੋਂ ਮਗਰੋਂ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਖੇਤਰ ਵਿਚ ਕੀ ਉੱਨਤੀ ਹੋਈ ? ਚਾਨਣਾ ਪਾਉ । (20)
- (ਅ) ਮੱਧਕਾਲੀ ਪੰਜਾਵੀ ਵਾਰਤਕ ਦੀ ਜਨਮਸਾਖੀ ਪਰੰਪਰਾ ਨਾਲ ਜਾਣ ਪਛਾਣ ਕਰਾਉ । (15)
- (ੲ) ਪੰਜਾਬੀ ਨਾਂਵ ਵਾਕਾਂਸ਼ ਅਤੇ ਕਿਰਿਆ ਵਾਕਾਂਸ਼ ਸੰਬੰਧੀ ਚਰਚਾ ਕਰੋ । (15)

SECTION - B

5. ਪ੍ਰਸ਼ਨ

(5×10=50)

- (ੳ) ਮੋਹਨ ਸਿੰਘ ਦੀ ਸਫਲਤਾ ਦਾ ਵੱਡਾ ਕਾਰਨ ਉਦ ਦੀ ਰਚਨਾ ਦੀ ਬਹੁਮੁੱਖਤਾ ਹੈ । ਚਰਚਾ ਕਰੋ । (10)
- (ਅ) ਬੁਝਾਰਤਾਂ ਦੀ ਸਮਾਜ ਸਭਿਆਚਾਰਕ ਸਾਰਥਕਤਾ 'ਤੇ ਨੋਟ ਲਿਖੋ । (10)
- (ੲ) ਗੁਰਦਿਆਲ ਸਿੰਘ ਦੀ ਨਾਵਲੀ ਵਿਖੱਲਣਤਾ ਬਾਰੇ ਸੰਖੇਪ ਨੋਟ ਲਿਖੋ । (10)
- (ਸ) ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ ਦੀਆਂ ਦੇਸ਼ ਵੰਡ ਨਾਲ ਸੰਬੰਧਤ ਦੋ ਕਹਾਣੀਆਂ ਬਾਰੇ ਸੰਖੇਪ ਵਿਚ ਦੱਸੋ । (10)
- (ਹ) ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਵਿਚ ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ ਦਾ ਕੀ ਸਥਾਨ ਹੈ ? (10)

6. ਪ੍ਰਸ਼ਨ

- (ੳ) ਲੋਕ ਗੀਤ ਦੀ ਪਰਿਭਾਸ਼ਾ ਦੇਂਦੇ ਹੋਏ ਲੋਕ ਗੀਤਾਂ ਦੀ ਪ੍ਰਕਿਰਤੀ/ਲੱਛਣਾਂ ਸੰਬੰਧੀ ਚਰਚਾ ਕਰੋ । (20)
- (ਅ) ਗੁਰਬਖਸ਼ ਸਿੰਘ ਪ੍ਰੀਤਲੜੀ ਨੇ ਖੁਸ਼ਹਾਲ, ਸੁਚੱਜੇ ਅਤੇ ਨਰੋਏ ਸਮਾਜ ਦੀ ਕਲਪਨਾ ਕੀਤੀ । ਉਸ ਦੇ ਨਿਬੰਧਾਂ ਵਿਚੋਂ ਉਦਾਹਰਨਾਂ ਦੇ ਕੇ ਸਪੱਸ਼ਟ ਕਰੋ । (15)
- (ੲ) ਜਗਤਾਰ ਦੀ ਕਵਿਤਾ ਦੀਆਂ ਚਾਰ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਦੱਸੋ । (15)

7. ਪ੍ਰਸ਼ਨ

- (ੳ) ਅੰਮ੍ਰਿਤ ਪ੍ਰੀਤਮ ਨੇ ਮਰਦ ਪ੍ਰਧਾਨ ਸਮਾਜਕ ਢਾਂਚੇ ਅੰਦਰ ਮਰਦ ਦੀਆਂ ਵਧੀਕੀਆਂ ਦੀ ਕਹਾਣੀ ਆਪਣੀ ਕਵਿਤਾ ਰਾਹੀਂ ਬਿਆਨ ਕੀਤੀ । ਉਦਾਹਰਨਾਂ ਸਹਿਤ ਚਰਚਾ ਕਰੋ । (20)
- (ਅ) ਆਈ. ਸੀ. ਨੰਦਾ ਸੁਧਾਰਵਾਦੀ ਪ੍ਰਵਿਰਤੀ ਨਾਲ ਸੰਬੰਧਿਤ ਮੋਢੀ ਨਾਟਕਕਾਰ ਹੈ । ਚਰਚਾ ਕਰੋ । (15)
- (ੲ) ਭਾਈ ਵੀਰ ਸਿੰਘ ਦੇ ਮਹਾਂ ਕਾਵਿ 'ਰਾਣਾ ਸੂਰਤ ਸਿੰਘ' ਤੇ ਸੰਖੇਪ ਨੋਟ ਲਿਖੋ । (15)

8. ਪ੍ਰਸ਼ਨ

- (ੳ) ਪੰਜਾਬੀ ਸਾਹਿਤ ਉੱਤੇ ਪਏ ਪੱਛਮੀ ਪ੍ਰਭਾਵਾਂ ਸੰਬੰਧੀ ਚਰਚਾ ਕਰੋ । (20)
- (ਅ) ਜਸਵੰਤ ਸਿੰਘ ਕੰਵਲ ਦੀ ਨਾਵਲ ਕਲਾ ਤੇ ਨੋਟ ਲਿਖੋ । (15)
- (ੲ) ਸ਼ਿਵ ਕੁਮਾਰ ਦੇ ਲਿਖੇ ਹੋਏ ਪ੍ਰਗੀਤਾਂ ਵਿਚ ਪ੍ਰਾਪਤ ਬਿਰਹਾ ਅਤੇ ਪੀੜ੍ਹ ਤੇ ਸੰਖੇਪ ਨੋਟ ਲਿਖੋ । (15)

CC(M)
SANSKRIT
(LITERATURE)
PAPER - I

Time Allowed - Three Hours

[32]

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instruction carefully before attempting questions.

- i) There are **EIGHT** questions divided in two Sections and printed in **SANSKRIT**.
- ii) Candidate has to attempt **FIVE** questions in all.
- iii) Questions No. 1 and 5 are compulsory and out of the remaining, **THREE** are to be attempted choosing at least **ONE** question from each Section.
- iv) The number of marks carried by a question/part is indicated against it.
- v) Answers must be written in the medium authorized in the Admission Certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in a medium other than the authorized one.
- vi) Word limit in questions, wherever specified, should be adhered to.
- vii) Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

खण्ड - A / SECTION - A

1. अधोलिखिताः सर्वे प्रश्नाः संस्कृतभाषया समाधेयाः।

Answer all of the following (to be written in Sanskrit Language).

- a) अधोनिर्दिष्टाः सर्वे प्रश्नाः संस्कृतेन समाधेयाः - (1×10=10)
- 'क, ट, म' - एषां वर्णानाम् उच्चारणस्थानानि कानि ?
 - सवर्णसञ्ज्ञाविधायकं सूत्रं किम् ?
 - 'देव+ऐश्वर्यम्' - अत्र सूत्रोल्लेखपूर्वकं सन्धिकार्यं विधेयम्।
 - अच् - प्रत्याहारान्तर्गता वर्णाः के ?
 - 'धात्रंशः' इत्यत्र सन्धिविच्छेदः कीदृशः ?
 - प्रगृह्यसञ्ज्ञाविधायकं सूत्रं किम् ?
 - 'घनश्यामः' - अत्र विग्रहपूर्वकं समासनाम लेख्यम्।
 - 'शक्तिमनतिक्रम्य' - अत्र समासनामोल्लेखपूर्वकं समासो विधेयः।
 - 'चोरमयम्' - अत्र विग्रहपूर्वकं समासनाम लेख्यम्।
 - 'रामो ग्रामं गच्छति' - अत्र वाच्यपरिवर्तनं क्रियताम्।
- b) रेखाङ्कितपदेषु सूत्रोल्लेखपूर्वकं विभक्तिः निर्णया - (2×5=10)
- उभयतः कृष्णं गोपाः।
 - हे राम।
 - पुत्रेण सहागतः पिता।
 - वृक्षात् पत्रं पतति।
 - विप्राय गां ददाति।
- c) अधोलिखितानां सूत्राणामर्थः स्वसंस्कृतेन सोदाहरणं लेख्यः - (2×5=10)
- परः सन्निकर्षः संहिता।
 - ससजुषो रूः।
 - एङः पदान्तादति।
 - आधारोऽधिकरणम्।
 - तुल्यास्यप्रयत्नं सवर्णम्।
- d) संस्कृतव्याकरणे समासविधिमाश्रित्य निबन्धो लेख्यः। (10)
- e) 'संस्कृतं नाम दैवीवागन्वाख्याता महर्षिभिः' - कथनमिदं समालोचयत। (10)

2. अधोलिखिताः सर्वे प्रश्नाः समाधेयाः।

Answer all of the following :

- a) वैदिकसंहितानां स्वरूपं वैशिष्ट्यञ्च विविच्यताम्। (20)
Explain the characteristics and importance of vedic samhitas.
- b) संस्कृत काव्यशास्त्रे रससिद्धान्तस्य वैशिष्ट्यं समीक्ष्यताम्। (15)
Critically analyze the characteristics of Rasa-Siddhānta in Sanskrit poetics.
- c) भाषाविज्ञानक्षेत्रे पाणिनेः योगदानं प्रकाशयताम्। (15)
Throw light on the contribution of Panini in linguistic studies.

3. अधोलिखिताः सर्वे प्रश्नाः समाधेयाः।

Answer all of the following :

- a) संस्कृतपद्यकाव्यपरम्परायाः उत्पत्तिविकासौ समीक्ष्येताम्। (15)
Examine critically the origin and development of tradition of Sanskrit poetry.
- b) 'रम्या रामायणी कथा' – उक्तिरियं समीक्ष्यताम्। (15)
'रम्या रामायणी कथा' - Examine critically this statement.
- c) 'मेघे माघे गतं वयः' – कथनमिदं समालोच्यताम्। (10)
'मेघे माघे गतं वयः' - Explain this statement.
- d) लक्षणायाः स्वरूपं सोदाहरणं प्रतिपाद्यताम्। (10)
Explain with examples the concept of 'Lakshāna'.

4. अधोलिखिताः सर्वे प्रश्नाः समाधेयाः।

Answer all of the following :

- a) संस्कृतखण्डकाव्यस्य उत्पत्तिः परम्परा च विविच्येताम्। (20)
Discuss the origin and tradition of Sanskrit Khanda-Kāvya.
- b) संस्कृतकाव्यशास्त्रे समुक्तं काव्यहेतुविमर्शं विशदयत। (15)
Elucidate 'Kāvya-hetu' as explained in Sanskrit poetics.
- c) औचित्यसम्प्रदायमाश्रित्य निबन्धो लेख्यः। (15)
Write an essay on Auchitya - sampradāya.

खण्ड – B / SECTION - B

5. अधोलिखिताः सर्वे प्रश्नाः संस्कृतभाषया समाधेयाः।

(5×10=50)

Answer all of the following (to be written in Sanskrit Language) :

- a) धर्मपुरुषार्थमाश्रित्य निबन्धो लेख्यः।
- b) विवाहसंस्कारस्य स्वरूपं प्रतिपाद्यताम्।
- c) आश्रमव्यवस्थायाः वैशिष्ट्यं निरूप्यताम्।
- d) जैनदर्शनानुसारं सप्तभङ्गीनयो वर्ण्यताम्।
- e) प्राचीनभारतं खगोलविज्ञानमधिकृत्य निबन्धो लेख्यः।

6. अधोलिखिताः सर्वे प्रश्नाः उत्तरणीयाः।

Answer all of the following :

- a) सांख्यदर्शनानुसारं पुरुषबहुत्वं निरूपयत। (20)
Explain 'Purushabahutva' according to sankhya philosophy.
- b) शाङ्कर वेदान्तानुसारेण अविद्यायाः स्वरूपं प्रतिपाद्यताम्। (15)
Explain the concept of 'Avidyā' according to Shankara - vedānta.
- c) बौद्धदर्शनस्य वैभाषिकसम्प्रदायो निरूप्यताम्। (15)
Discribe the vaibhashika School of Buddhist philosophy.

7. अधोलिखिताः सर्वे प्रश्नाः समाधेयाः।

Answer all of the following :

- श्रीमद्भगवद्गीतानुसारं कर्मयोगसिद्धान्तं निरूपयत। (20)
Explain the theory of 'Karmayoga' according to Shrimadbhagawadgita.
- न्यायदर्शनाभिमतं प्रामाण्यवादं परिचाययत। (15)
Clarify the theory of 'Pramanyavada' according to Nyāya - philosophy.
- चार्वाकदर्शनमाश्रित्य देहात्मवादं निरूपयत। (15)
Explain the theory of 'Dehatnavāda' according to chārvaka - philosophy.

8. अधोलिखिताः सर्वे प्रश्नाः संस्कृत भाषया समाधेयाः

Answer all of the following (to be written in Sanskrit language) :

- अधोलिखित सन्दर्भमवधार्य तदाश्रयेण पृष्ठानां प्रश्नानां – मुत्तरं स्वसंस्कृतेन लेख्यम्। प्रत्येकमुत्तरं देवनागरी – लिप्यां पङ्क्तिचतुष्टयानधिकं भवेत्। (5×5=25)
आर्षपरम्पराया वैशिष्ट्यमिदं यदत्र मानवीयसम्बन्धाः कर्तव्यरूपेण विवेचिताः नाधिकारत्वेन। यथा धर्मशास्त्रदिशा विवाहादेः कर्तव्यत्वमेव नाधिकाररूपता। कर्तव्यसम्बद्धा एवाधिकाराः। अतो यदा कर्तव्यानि परिभाषितानि भवन्ति शास्त्रे तदाधिकाराः स्वत एव निश्चिताः सञ्जायन्ते। भारत व्यतिरिक्तपरम्परासु कर्तव्याधिकार योर्युगपत् प्रवृत्तिः। अत्र तु अधिकारस्यानन्तर्यमिति निर्द्वन्द्वः सुग्राह्यश्च पन्थाः। भारतीयचिन्तने व्यक्तेरधिकाराः तदीयसामाजिकोत्तरदा-वित्वेभ्यः पृथङ् न भवन्ति। तत्र व्यक्तेर्मौलिकमधिकार-द्वयं जीवनाधिकारः आध्यात्मिकविकासाधिकारश्चेति। एतज्जन्मसिद्धम्। 'मा हिंस्यात् सर्वा भूतानि' इत्थमहिंसारूपेण, 'तमेव विदित्वाति मृत्युमेति' इत्थश्च मोक्षरूपेण कर्तव्यपथमानीयते।
i) विवाहस्य अधिकाररूपता कथं नास्ति?
ii) युगपत् प्रवृत्तिः कयोः भवति?
iii) मौलिकाधिकारौ कौ भवतः?
iv) अहिंसाश्रुतिः का विद्यते?
v) भारतीयपरम्परायाः किं वैशिष्ट्यम्?
- अधोलिखितसन्दर्भमवधार्य तदवलम्बनेन पृष्ठानां प्रश्नानामुत्तरं स्वसंस्कृतेन लेख्यम्। प्रत्येकमुत्तरं देवनागरीलिप्या पङ्क्तिचतुष्टयानधिकं भवेत्। (5×5=25)
केनाप्याङ्गलदेशीयकविना पोपारख्येनोक्तं यन्मानवजातेर्गभीराध्ययनविषयो मनुष्य एव, स एवाध्येतव्य इति समीचीततरम्। सोऽयं मनुजो न वस्तुरूपो न वा पदार्थः। दार्शनिकदिशा पदार्थसङ्घातो भवेद् वा न वा। हासविलासादिभूषितोऽयं प्राणी विशिष्टे एव। सम्प्रति त्वयं मनुष्यो विज्ञानकलाप्रविधिकक्षेत्रेषु समर्जितां स्वीयामाश्चर्यावहाम् उन्नतिं दृष्ट्वा गौरवान्वितो भवेन्नाम। परन्तु संस्कृतेर्हासोन्मुखत्वं तत्र च समाच्छादितं घनान्धकारं दृष्ट्वा भीतभीतोऽपि वर्तते। इदङ्काले स्वयमसन्तुष्टः संशयविमूढो लक्ष्यविच्युतश्च समस्यास्वरूपः सञ्जातः।
i) आङ्गलकवेः किं मतम्?
ii) दार्शनिकदिशा मनुष्यः कथं विशिष्टः?
iii) केन कारणेन गौरवान्वितो मनुष्यः?
iv) मनुष्यः कस्मात् हेतोः भीतः?
v) केन कारणेन मनुष्यः समस्यास्वरूपो जातः?

CC(M)
DOGRI
PAPER - I

[26]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting questions.

- i) There are **EIGHT** questions divided in two Sections and printed in **Dogri**.
- ii) Candidate has to attempt **SIX** questions in all.
- iii) Follow the instructions for answering the questions. Given at the beginning of each section.
- iv) The number of marks carried by a question/part is indicated against it.
- v) Answers must be written in the medium authorized in the Admission Certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in a medium other than the authorized one.
- vi) Word limit in questions, wherever specified, should be adhered to.
- vii) Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

SECTION - A

हिदायत - सुआल नं. 1 जरूरी ऐ। बाकी त्र'ऊं सुआलें (2, 3 ते 4) चा कोई दो सुआल करो।

1. अ) मध्यभाशा काल (पालि, प्राकृत ते अपभ्रंश दे काल) च डोगरी दा सरबंध कुस केहड़ी प्राकृत कन्नै रेहा ? तत्थें ते प्रमाणें दे अधार उप्पर परता देओ। (30)
- ब) डोगरी भाशा दियें खंडेतर ध्वनियें बारै उदाहरणें समेत जानकारी देओ। (25)

जां (OR)

- अ) “डोगरी भाशा उन्नी गै परानी ऐ जिन्नियां भारत दियां दूइयां आधुनिक भाशां” इस कथन दी पुष्टी च विद्वानें दे मत स्पष्ट करो। (30)
 - ब) डोगरी भाशा दियें विशेषताएं बारै उदाहरणें समेत जानकारी देओ। (25)
2. डोगरी भाशा दियें स्वर जां व्यंजन ध्वनियें बारै उदाहरणें समेत जानकारी देओ। (35)
 3. डोगरी च वाक्य-प्रकारें दा परिचे दिंदे होई सरल जां सयुक्त वाक्यें बारै उदाहरणें समेत जानकारी देओ। (35)
 4. ‘डोगरा अक्खर’ लिपि दे विकास दी चर्चा करदे होई इस लिपि दे बरतून च नेई रौहने दे कारणें बारै अपने विचार लिखो। (35)

SECTION - B

हिदायत - सुआल नं. 5 जरूरी ऐ। बाकी त्र'ऊं सुआलें (6, 7 ते 8) चा कोई दो सुआल करो।

5. “अज़ादी बाद दी डोगरी कविता च प्रगतिवाद दा सुर प्रमुख लभदा ऐ” इस कथन कन्नै तुस कु'त्थूं तगर सैहमत ओ ते की ? उदाहरणें कन्नै स्पष्ट करो। (55)

जां (OR)

हेठ दिक्ती दिये पुस्तके चा कु'ने पं'जे दे बारे च 40-40 शब्दे च उं'दी साहित्यक म्हत्ता बारे अपने विचार लिखो।
(5×11=55)

क) झुल्ल बड़ा देआ पत्तरा

ख) घर

ग) सुन्ने दी चिड़ी

घ) झकदियां किरणां

ङ) आले

च) सोध समुंदरें दी

छ) रत्तु दा चानन

ज) हाशिए पर

झ) मेरी कविता मेरे गीत

ञ) रेशम दे कीड़े

6. डोगरी लोक गाथाएं दा परिचे देइयै कारके जां बारे बारे तफसीली जानकारी देओ । (35)

7. डोगरी उपन्यासें दी विकास यात्रा च नरसिंह देव जम्वाल जां वेद राही दे योगदान बारे विस्तार च चर्चा करो।(35)

8. डोगरी कहानी दे विकास च बंधु शर्मा जां छत्रपाल दे योगदान बारे तफसीली जानकारी देओ । (35)

CC(M)
PUBLIC ADMINISTRATION
(OPTIONAL)
PAPER - I
[51]

Time Allowed - Three Hours

Maximum Marks-250

INSTRUCTIONS

Please read each of the following Instructions carefully before attempting the paper.

- i) *There are eight questions divided in two Sections and printed in English. Candidate has to attempt **Five** questions in all. Questions No.1 and 5 are compulsory and out of the remaining, any **Three** are to be attempted choosing at least One question from each Section. The number of marks carried by a Question/Part is indicated against it. Answers must be written in English in Question-Cum-Answer (QCA) Booklet in the space provided.*
- ii) *Your answer should be precise and coherent.*
- iii) *If you encounter any typographical error, please read it as it appears in the text book.*
- iv) *Candidates are in their own interest advised to go through the general instructions on the back side of the title page of the Answer Script for strict adherence.*
- v) *No continuation sheets shall be provided to any candidate under any circumstances.*
- vi) *No blank page be left in between answer to various questions.*

SECTION - A

1. Answer the following questions in about 150 words.
 - a) The new Public administration is less 'generic' and more 'Public'. Elaborate. (10)
 - b) Development administration is just a sugar-coated concept trying to cover up the essentially inegalitarian and unjust nature of the third world state. Do you agree? Give reasons. (10)
 - c) Do you agree with Weber's understanding that bureaucracy is the universal and most progressive and modern form of Government? Substantiate with reasons. (10)
 - d) In what respects is Taylor's 'Scientific Management' or classical motivation theory different from the classical organizational theory expounded by Gulick, Urwick etc? (10)
 - e) Discuss the New Public Service Model of Administration. (10)
2.
 - a) Media's role as the fourth pillar of Democracy is frequently being questioned. Do you agree? Give Reasons. (20)
 - b) Right to Information promotes transparency and accountability in the working of every public institution. Explain. (15)
 - c) Critically examine A. V. Dicey's formulations of Administrative law. How have they changed over the last few decades? (15)
3.
 - a) Comparative Public Administration both resembles and differs from modern organisation theory. Elaborate. (20)
 - b) Political and Administrative System have reciprocal relationship. Discuss. (15)
 - c) Affirmative action in socio-economic development has not altogether eliminated discrimination. Discuss it in the context of Women Empowerment. (15)
4.
 - a) The Concept of Development is multi-dimensional and ever-expanding. Explain. (20)
 - b) According to Weber, "an ethic of ultimate ends and an ethic of responsibility are not absolute contrasts but rather supplements, which only in unison constitute a genuine man". Discuss the statement with special reference to administrative values. (15)
 - c) Training has proved its incapacity to change attitudes, behaviour, and values of Civil servants. Do you agree with this statement. Give Reasons. (15)

SECTION - B

Answer the following questions in about **150 words** each:

(5×10=50)

5.
 - a) Are people only the beneficiary of public policies? Answer the question with special reference to the policy making process. **(10)**
 - b) Discuss the major challenges of policy implementation and evaluation. Give suggestions for improvement. **(10)**
 - c) Information Technology brings efficiency and transparency to Public Administration. Examine the statement with suitable examples. **(10)**
 - d) Discuss the major constraints and facilitators of e-Government in a public organization. **(10)**
 - e) Markets, Hierarchies and Networks represent modern governing structures in Government. Explain. **(10)**
6.
 - a) Performance budgeting is the best way of achieving accountability of Public Administration. Explain **(20)**
 - b) What new models of budgetary capacity and incapacity have emerged after the decline of planning, programming, budgeting and zero-based budgeting. **(15)**
 - c) Public borrowing produces different effects on the economy? Examine. **(15)**
7.
 - a) Karl Deutsch's concept of "feedback" introduces the elements of dynamism into what could otherwise be a static analysis. Discuss which institution and groups are intrinsic to the "feedback" in the Government's Communication system. **(20)**
 - b) Simon's identifying decision making as the core field of public administration appears logically acceptable but his positivist under pinning is problematic. Examine the statement. **(15)**
 - c) The Central concern of Administrative Law has been the legal limitation of administrative discretion. Give Reasons. **(15)**

8. a) Autonomy and accountability in public enterprises cannot walk together. Explain.(20)
- b) The Widening gap in emoluments of Government employees versus the public sector corporations and private sector employees has a strong bearing on the motivation and ability to work. Comment. (15)
- c) Discuss the essential characteristics of Public sector-centered and market-centered perspectives in Public-Private Partnership. (P,P,P) and also compare the two. (15)
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