

MET 2020 Memory Based Question Paper PDF

Physics

1. A body of mass m rises to a height $h = \frac{R}{5}$ from the earth's surface, where R is the earth's radius. If g is acceleration due to gravity at the earth's surface, the increase in potential energy will be

(a) mgh (b) $\frac{4}{5}mgh$ (c) $\frac{5}{6}mgh$ (d) $\frac{6}{7}mgh$

2. The energy required to break the covalent bond in a semiconductor is

(a) always 1 eV
 (b) equal to the forbidden energy gap of semiconductor
 (c) equal to fermi energy
 (d) much less than fermi energy

3. When a glass prism of refracting angle 60° is immersed in a liquid its angle of minimum deviation is 30° . The critical angle of glass with respect to the liquid medium is

(a) 45° (b) 42° (c) 50° (d) 52°

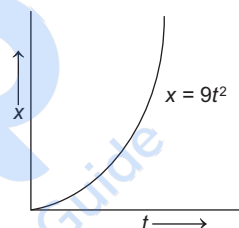
4. Faraday constant

(a) depends on the amount of the electrolyte
 (b) depends on the current in the electrolyte
 (c) is a universal constant
 (d) depends on the amount of charge passed through the electrolyte

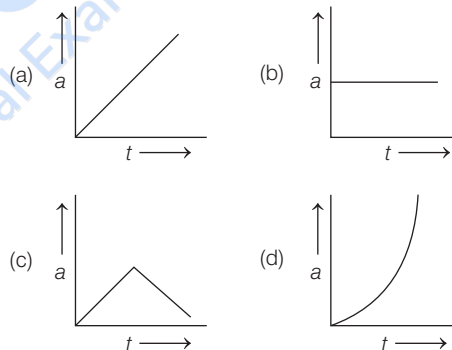
5. A comb is run through wet hair on a rainy day, then

(a) it will attract large number of small bits of paper
 (b) it will not go through the hair
 (c) it will not attract small bits of paper
 (d) None of the above

6. The displacement-time graph of a particle moving along a straight line is shown in the figure.



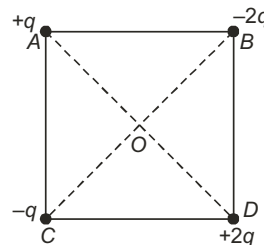
The acceleration-time graph of this particle is



7. The maximum kinetic energy of photoelectrons coming out of a metal surface is 10 eV. The minimum voltage required to stop the emission of electrons from this metal surface is

(a) 10 V (b) 5 V
 (c) -5 V (d) -10 V

8. Thermal radiation exist in which part of electromagnetic spectrum?
(a) Ultraviolet (b) Infrared
(c) Visible (d) Violet
9. A rod of length L is composed of a uniform length $\frac{L}{2}$ of wood whose mass is m_w and a uniform length $\frac{L}{2}$ of brass whose mass is m_b .
The moment of inertia I of the rod about an axis perpendicular to the rod and through its centre is equal to
(a) $(m_w + m_b) \frac{L^2}{6}$ (b) $(m_w + m_b) \frac{L^2}{2}$
(c) $(m_w + m_b) \frac{L^2}{12}$ (d) $(m_w + m_b) \frac{L^2}{3}$
10. A particle, doing simple harmonic motion, at a distance 3 cm from mean position has acceleration 12 cm/s^2 . What is its time period?
(a) 0.5 s (b) 1 s (c) 2 s (d) 3.14 s
11. A step up transformer has turn ratio 10 : 1. A cell of emf 2 V is fed to the primary, then the secondary voltage developed is
(a) 20 V (b) 10 V (c) 2 V (d) zero
12. A man at a distance 11 km from two pillars wants to see two pillars separately. What will be the approximate distance between the pillars?
(a) 3 m (b) 1 m (c) 0.25 m (d) 0.5 m
13. Dimensions of Stefan's constant is
(a) $[\text{MLT}^{-3}\theta^{-4}]$ (b) $[\text{MT}^{-3}\theta^{-4}]$
(c) $[\text{M}^2\text{T}^{-3}\theta^{-4}]$ (d) $[\text{M}^2\text{T}^{-2}\theta^{-4}]$
14. Time period of oscillation of mass m suspended from a spring is T . What is the time period when the spring is cut in half and the same mass is suspended from one of the halves?
(a) $T/2$ (b) $T/\sqrt{2}$
(c) $\sqrt{2} T$ (d) $2 T$
15. An electric current of 2 A passes through a wire of resistance 25Ω . How much heat will be generated in 1 min?
(a) $6 \times 10^3 \text{ J}$ (b) $3.6 \times 10^3 \text{ J}$
(c) $0.6 \times 10^3 \text{ J}$ (d) $0.36 \times 10^3 \text{ J}$
16. A mass m hanging from a spring is doing simple harmonic motion with frequency f . If the mass is increased by 4 times, then frequency will be
(a) $2 f$ (b) $f/2$ (c) $4 f$ (d) $f/4$
17. Internal energy of a gas remains unchanged in
I. an isothermal process
II. an adiabatic process
III. a reversible process
IV. a cyclic process
Which of these are true?
(a) I and IV (b) I, III and IV
(c) III and IV (d) II and III
18. An electric charge in uniform motion produces
(a) only electric field
(b) only magnetic field
(c) Both electric and magnetic field
(d) Neither electric nor magnetic field
19. If λ is the incident wavelength and λ_0 is the threshold wavelength for a metal surface, photoelectric effect takes place only, if
(a) $\lambda \leq \lambda_0$ (b) $\lambda \geq \lambda_0$
(c) $\lambda \geq 2\lambda_0$ (d) None of these
20. The mass number of an atom is 15 and its atomic number is 7. Now, this atom absorbs an α -particle and emits a proton. What will be the mass number of changed atom?
(a) 16 (b) 18 (c) 17 (d) 15
21. What is the direction of the electric field at the centre O of the square in the figure shown below? Given that, $q = 10 \text{ nC}$ and the side of the square is 5 cm.



- (a) at 45° to OA upward
(b) at 135° to OA towards BD
(c) no direction, because $E = 0$
(d) None of the above

22. Which equation is valid for adiabatic process?

- (a) $TV^{\gamma-1} = \text{constant}$ (b) $pV^{\gamma-1} = \text{constant}$
(c) $T^{\gamma}V^{\gamma-1} = \text{constant}$ (d) $\frac{p^{\gamma-1}}{T^{\gamma-1}} = \text{constant}$

23. Which of the following relation correct?

(v_{rms} - root mean square velocity, $\bar{v}$ - mean velocity and v_{mp} - most probable velocity)

- (a) $v_{\text{rms}} > \bar{v} < v_{\text{mp}}$ (b) $v_{\text{rms}} < \bar{v} > v_{\text{mp}}$
(c) $v_{\text{rms}} > \bar{v} > v_{\text{mp}}$ (d) None of these

24. The effect of reverse bias in a junction diode on its potential barrier is

- (a) increases (b) decreases
(c) remains same (d) None of these

25. During an experiment, an ideal gas is found to obey an additional law $Vp^2 = \text{constant}$. The gas is initially at temperature T and volume V . The temperature of the gas will be following, when it expands to a volume $2V$?

- (a) $\sqrt{2} T$ (b) $\sqrt{4} T$ (c) $\sqrt{6} T$ (d) $\sqrt{5} T$

26. In which of the following process, convection does not take place primarily?

- (a) Sea and land breeze
(b) Boiling of water
(c) Warming of glass bulb due to filament
(d) Heating air around furnace

27. The horizontal component of earth's magnetic field at a place is $0.4 \times 10^4 \text{ T}$. If the angle of dip is 45° the value of total intensity of earth's magnetic field is

- (a) $0.5 \times 10^{-4} \text{ T}$ (b) $0.4 \times 10^{-4} \text{ T}$
(c) $0.5 \times 10^{-6} \text{ T}$ (d) $0.4 \times 10^{-6} \text{ T}$

28. If an observer moves towards stationary source, then the apparent frequency is given by

- (a) $f' = f \left(\frac{v + v_0}{v} \right)$ (b) $f' = f \left(\frac{v - v_0}{v} \right)$
(c) $f' = f \left(\frac{v}{v + v_0} \right)$ (d) $f' = f \left(\frac{v}{v - v_0} \right)$

29. Two coils have mutual inductance of 1.5 H . If current in primary coil is suddenly raised to 5 A in one milli second, the induced emf in the secondary coil is

- (a) 75 V (b) 750 V
(c) 7500 V (d) 75000 V

30. The formula for magnetic field of a certain component is given by $B = \frac{\mu_0 Ni}{2\pi r}$,

where, N = total number of turns

i = current through it

r = radius.

The component is

- (a) ring (b) solenoid
(c) toroid (d) None of these

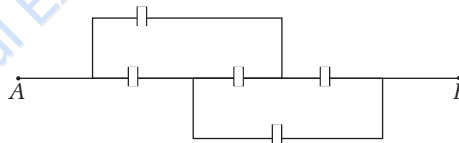
31. A convex lens of focal length 0.12 m produces an image, which is three times as long as the object. The distance between the object and the lens for a real image

- (a) 0.16 m (b) -0.16 m
(c) 1.6 m (d) -1.6 m

32. An object is moving in a circle at constant speed v . The magnitude of the rate of change of momentum of the object is

- (a) zero (b) proportional to v^2
(c) proportional to v^3 (d) proportional to v

33. Five equal capacitors each with capacitance C are connected as shown in figure. Then, the equivalent capacitance between A and B is



- (a) $5C$ (b) $\frac{C}{5}$ (c) $3C$ (d) C

34. The time period of a freely suspended magnet is 4 s . If it is broken in length into two equal parts and one part is suspended in the same way, then the time period will be

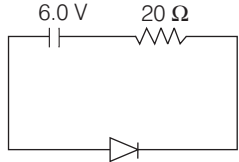
- (a) 4 s (b) 2 s (c) 0.5 s (d) 0.25 s

35. A spring of force constant k is cut into two pieces such that one piece is double the length of other. Then, the long piece will have a force constant of

- (a) $\frac{2}{3}k$ (b) $\frac{3}{2}k$ (c) $3k$ (d) $6k$

36. Half-life period of a radioactive substance is 10 min , then amount of substance decayed in 40 min will be

- (a) 25% (b) 50%
(c) 75% (d) None of these

37. Two identical containers A and B with frictionless pistons contain the same ideal gas at the same temperature and the same volume V . The mass of the gas in A is m_A and that in B is m_B . The gas in each container is now allowed to expand isothermally to the same final volume $2V$. The changes in the pressure in A and B are to be found Δp and $1.5 \Delta p$ respectively, then relation for masses will be
- (a) $4m_A = 9m_B$ (b) $2m_A = 3m_B$
 (c) $3m_A = 2m_B$ (d) $9m_A = 4m_B$
38. If one mole of a monoatomic gas $\left(\gamma = \frac{5}{3}\right)$ is mixed with one mole diatomic gas $\left(\gamma = \frac{7}{5}\right)$, the value of γ for the mixture is
- (a) 1.40 (b) 1.50 (c) 1.53 (d) 3.07
39. A solid sphere of mass 2 kg rolls on a smooth horizontal surface at 10 m/s and then rolls up a smooth 30° incline. The maximum height reached by the sphere is ($g = 9.8 \text{ m/s}^2$)
- (a) 10 m (b) 4.9 m (c) 14.2 m (d) 7.1 m
40. How much deep inside the earth (radius R) should a man go, so that his weight becomes one-fourth of that on the earth's surface?
- (a) $\frac{R}{2}$ (b) $\frac{3R}{4}$ (c) $\frac{R}{4}$ (d) $\frac{R}{3}$
41. Four projectiles are thrown with the same initial speed making angles 27° , 36° , 43° , 51° , with the horizontal. The range of projectiles will be largest for the projectile fired at angle
- (a) 27° (b) 36° (c) 43° (d) 51°
42. A wire of resistance 5Ω is drawn out so that its length is increased by twice its original length, its new resistance is
- (a) 45Ω (b) 54Ω (c) 20Ω (d) 5Ω
43. The magnifying power of a telescope is m' . If the focal length of the eye piece is doubled, then its magnifying power will become
- (a) $\sqrt{2} m$ (b) $3 m$ (c) $2 m$ (d) $\frac{m}{2}$
44. On a heater coil it is written that, 250 V, 500 W. What is the resistance of this coil?
- (a) 62.5Ω (b) 100Ω (c) 200Ω (d) 125Ω
45. When a dielectric slab is introduced between the plates of a capacitor connected to a battery, then
- (a) charge on capacitor increases
 (b) potential difference across the capacitor increases
 (c) energy stored increases
 (d) capacity remains the same
46. A concave lens is kept in contact with a convex lens of focal length 20 cm. The combination works as convex lens of focal length 50 cm. The power of concave lens is
- (a) $P = -3.0 \text{ D}$ (b) $P = +3.0 \text{ D}$
 (c) $P = -0.3 \text{ D}$ (d) $P = +0.3 \text{ D}$
47. The critical angle for glass water interface $\left(\text{if } {}^a\mu_g = \frac{3}{2}, {}^a\mu_w = \frac{4}{3}\right)$
- (a) $\sin^{-1}\left(\frac{8}{9}\right)$ (b) $\sin^{-1}\left(\frac{9}{8}\right)$
 (c) $\sin^{-1}\left(\frac{3}{2}\right)$ (d) $\sin^{-1}\left(\frac{4}{3}\right)$
48. What is the current through the circuit and the potential difference across the diode shown in figure. The drift current for the diode is $30 \mu\text{A}$.
- 
- (a) $30 \mu\text{A}$, 5.99 V (b) $30 \mu\text{A}$, 5 V
 (c) $20 \mu\text{A}$, 6 V (d) $20 \mu\text{A}$, 5.99 V
49. A man who wears glasses of power 3 D must holds a newspaper at least 25 cm away to see the print clearly. How far away would the newspaper have to be if he took off the glasses and still wanted clear vision?
- (a) 10 cm (b) 25 cm
 (c) 1 m (d) -1 m
50. The force per unit length between two parallel current carrying straight conductors separated by $2d$ is given by the formula
- (a) $\frac{\mu_0}{4\pi} \frac{i_1 i_2}{d}$ (b) $\frac{\mu_0}{4\pi} \frac{i_1 i_2}{2d}$
 (c) $\frac{\mu_0}{\pi} \frac{i_1 i_2}{2d}$ (d) None of these

Chemistry

1. Which of the following is not basic amino acid?

- (a) Leucine (b) Lysine
(c) Arginine (d) Histidine

2. In qualitative analysis, NH_4Cl is added before NH_4OH

- (a) to increase $[\text{OH}^-]$ concentration
(b) for making HCl
(c) to decrease $[\text{OH}^-]$ concentration
(d) statement is wrong

3. Certain electric current for half an hour can collect 11.2 L of hydrogen at NTP. Same current when passed through an electrolytic solution for one hour, can deposit how much silver?

- (a) 216 g (b) 108 g (c) 47 g (d) 60 g

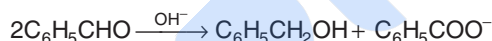
4. Which of the following complexes is an outer orbital complex?

- (a) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (b) $[\text{Fe}(\text{CN})_6]^{4-}$
(c) $[\text{Ni}(\text{NH}_3)_6]^{2+}$ (d) $[\text{Mn}(\text{CN})_6]^{4-}$

5. Which is true for a cyclic process?

- (a) $\Delta E = 0$ (b) $\Delta E = q - W$
(c) $q = W$ (d) All of these

6. In the Cannizzaro reaction given below



The slowest step is

- (a) The attack of OH^- at the carbonyl group
(b) The transfer of hydride ion to the carbonyl group
(c) The abstraction of proton from the carboxylic acid
(d) The deprotonation of benzyl alcohol

7. The rate of a reaction doubles when the initial concentration of the reactant is made four fold. If the initial concentration is made 400 fold, then the rate will become

- (a) 400 times (b) 200 times
(c) 40 times (d) 20 times

8. Which compound present in diesel?

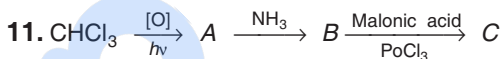
- (a) Cetane
(b) TiCl_4
(c) Cyclo pentadienyl manganese carbonyl
(d) Iso octane

9. Which of the following is an organometallic compound?

- (a) Lithium acetate
(b) Methyl lithium
(c) Lithium dimethyl amide
(d) Lithium methoxide

10. If in the reaction, $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$; α is the degree of dissociation of N_2O_4 , then total number of moles at equilibrium is

- (a) $(1 - \alpha)$ (b) $(1 + \alpha)$ (c) $(1 - \alpha)^2$ (d) $(1 - \alpha)^2$



The end product C in the following reaction is used as

- (a) explosive (b) hypnotic
(c) tear gas (d) analgesic

12. Which statement is false for white phosphorus (P_4) ?

- (a) It has six P—P single bonds
(b) It has four P—P single bonds
(c) It has four lone pairs of electrons
(d) It has PPP angle 60°

13. Natural rubber is a polymer of monomer isoprene. During polymerisation

- (a) 1, 4 addition takes place
(b) 1, 2 addition takes place
(c) 1, 3 addition takes place
(d) both double bonds are converted into single bond

14. Match List I (species) with List II (hybridisation) and select the correct code given below

List I		List II	
A.	XeF_4	(i)	dsp^2
B.	H_2O	(ii)	sp^3
C.	PCl_5	(iii)	sp^3d^2
D.	$[\text{Pt}(\text{NH}_3)_4]^{2+}$	(iv)	sp^3d

Codes

- | | | | | |
|-----|-------|------|------|-------|
| | A | B | C | D |
| (a) | (iii) | (ii) | (iv) | (i) |
| (b) | (i) | (iv) | (ii) | (iii) |
| (c) | (iii) | (iv) | (ii) | (i) |
| (d) | (i) | (ii) | (iv) | (iii) |

15. A new carbon-carbon bond formation is possible in :

I. Cannizzaro reaction

II. Friedel-Craft reaction

III. Clemmensen reduction

IV. Reimer-Tiemann reaction

- (a) I, II and III (b) II, III and IV
(c) I and III (d) II and IV

16. Which of the following compounds formed during Perkin's reaction?

- (a) Resorcinol (b) Cinnamic acid
(c) Benzaldehyde (d) Benzoin

17. The ratio of de-Broglie wavelengths for electron accelerated through 200 V and 50 V is

- (a) 1 : 2 (b) 2 : 1 (c) 3 : 10 (d) 10 : 3

18. Malachite decomposed to give $A + CO_2 + H_2O$ and compound A on reduction with carbon gives $CO + B$. Here, A and B are

- (a) CuO , Cu (b) Cu_2O , CuO
(c) Cu_2O , Cu (d) $CuCO_3$, Cu

19. Match List I with List II and choose correct answer from the codes given below

List I		List II	
A.	$NaNO_3$	(i)	Baking soda
B.	$Na(NH_4)HPO_4$	(ii)	Chile salt petre
C.	$NaHCO_3$	(iii)	Microcosmic salt
D.	$Na_2CO_3 \cdot 10H_2O$	(iv)	Washing soda

- | | | | | |
|-----|-------|-------|-------|-------|
| | A | B | C | D |
| (a) | (i) | (ii) | (iii) | (iv) |
| (b) | (ii) | (iii) | (i) | (iv) |
| (c) | (iii) | (i) | (ii) | (iv) |
| (d) | (iv) | (i) | (ii) | (iii) |

20. When MnO_2 is heated with PbO_2 and conc. HNO_3 , pink colour is obtained due to formation of

- (a) $KMnO_4$ (b) $HMnO_4$
(c) $Pb(MnO_4)_2$ (d) $PbMnO_4$

21. Which is mismatched for $NaCl$ crystal ?

- (a) $\frac{r^+}{r^-} = 0.414$ to 0.732
(b) Coordination number = 6:6
(c) Edge of unit cell = $(r^+ + r^-)$
(d) Crystal structure = fcc

22. Which of the following ions has the highest magnetic moment ?

- (a) Zn^{2+} (b) Ti^{3+} (c) Sc^{3+} (d) Mn^{2+}

23. Correct order for solubility of alkaline earth metals in water is

- (a) $MgF_2 > CaF_2 > SrF_2 > BaF_2$
(b) $MgF_2 < CaF_2 < SrF_2 < BaF_2$
(c) $MgF_2 > CaF_2 < SrF_2 < BaF_2$
(d) $BaF_2 > MgF_2 > SrF_2 > CaF_2$

24. An organic compound A contains 20% C, 46.66% N and 6.66% H. It gives NH_3 gas on heating with $NaOH$. A can be

- (a) CH_3CONH_2 (b) $C_6H_5CONH_2$
(c) NH_2CONH_2 (d) $CH_3NHCONH_2$

25. In the equilibrium mixture, $KI + I_2 \rightleftharpoons KI_3$, the concentration of KI and I_2 is made two fold and three fold respectively. The concentration of KI_3 becomes

- (a) two fold (b) three fold
(c) five fold (d) six fold

26. $A \xrightarrow{HOH/H^+}$ glucose + fructose

$B \xrightarrow{HOH/H^+}$ glucose + glucose

$C \xrightarrow{HOH/H^+}$ glucose + galactose

The disaccharides A , B and C respectively are

- (a) lactose, sucrose and maltose
(b) sucrose, maltose and lactose
(c) sucrose, lactose and maltose
(d) maltose, sucrose and lactose

27. n/p ratio during positron decay

- (a) increases (b) decreases
(c) remains constant (d) All of these

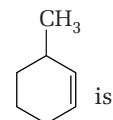
28. Number of carbon atoms in kerosene is

- (a) C_{17-20} (b) C_{12-16} (c) C_{20-25} (d) C_{25-30}

29. Which of the following polymers can be used for lubrication and as an insulator?

- (a) SBR (b) PVC (c) PTFE (d) PAN

30. The IUPAC name of



- (a) 3-methyl cyclohexene
(b) 1-methyl cyclohex-2-ene

- (c) 6-methyl cyclohexene
(d) 1-methyl cyclohex-5-ene
- 31. The correct representation of a complex ion is**
 (a) $[\text{Co}(\text{H}_2\text{O})(\text{NH}_3)_4\text{Cl}]^{2+}$
 (b) $[\text{CoCl}(\text{H}_2\text{O})(\text{NH}_3)_4]^{2+}$
 (c) $[\text{Co}(\text{NH}_3)_4\text{Cl}(\text{H}_2\text{O})]^{2+}$
 (d) $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]^{2+}$
- 32. Which element has maximum first ionisation potential?**
 (a) Cs (b) F (c) Na (d) He
- 33. In which of the following $\Delta E = \Delta H$?**
 (a) $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$
 (b) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$
 (c) $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$
 (d) $\text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightleftharpoons \text{H}_2\text{O}(\text{l})$
- 34. Calcination is used in metallurgy for removal of**
 (a) water and sulphide (b) water and CO_2
 (c) CO_2 and H_2S (d) H_2O and H_2S
- 35. What is the value of x on the $[\text{Ni}(\text{CN})_4]^x$ complex ion?**
 (a) +2 (b) -2 (c) 0 (zero) (d) +4
- 36. The activation energy of a reaction is zero. The rate constant of this reaction**
 (a) increases with an increase of temperature
 (b) decreases with an increase of temperature
 (c) decreases with decrease of temperature
 (d) is independent of temperature
- 37. Which of the following does not exist?**
 I. $\text{HO}_3\text{S}-\text{S}-\text{SO}_3\text{H}$ II. $\text{HO}-\text{Te}-\text{OH}$
 III. $\text{HS}-\text{S}_2-\text{SH}$ IV. $\text{HS}-\text{Po}-\text{OH}$
 (a) Only II (b) Only III
 (c) II and IV (d) I, III and IV
- 38. Which of the following notations shows the product incorrectly?**
 (a) $^{10}_5\text{B}(\alpha, n)^{13}_7\text{N}$ (b) $^{242}_{96}\text{Cm}(\alpha, 2n)^{243}_{97}\text{Bk}$
 (c) $^{14}_7\text{N}(n, p)^{14}_6\text{C}$ (d) $^{28}_{14}\text{Si}(d, \gamma)^{30}_{15}\text{P}$
- 39. Acidic dichromate ion reacts with hydrogen peroxide to give deep blue colour. This is due to the formation of**
 (a) $\text{CrO}(\text{O})_2$ (b) CrO_5
 (c) Both (a) and (b) (d) None of (a) and (b)
- 40. In blast furnace, the highest temperature is in**
 (a) reduction zone (b) slag zone
 (c) fusion zone (d) combustion zone
- 41. The reagent which distinguishes formic acid and acetic acid is**
 (a) 2, 4-dinitrophenyl hydrazine
 (b) HgCl_2
 (c) $\text{C}_2\text{H}_5\text{ONa}$
 (d) Hg_2Cl_2
- 42. Neon atom requires energy to remove one electron from its outermost orbit, so also to add one electron into the outermost orbit. Which of the following is correct about fluorine?**
 I. Fluorine releases energy when an electron is removed.
 II. Fluorine requires energy to add one electron.
 (a) (I) and (II) are correct
 (b) (I) is correct, (II) is false
 (c) (I) is false, (II) is correct
 (d) (I) and (II) are false
- 43. Liquid hydrocarbon is converted into mixture of gaseous hydrocarbons by**
 (a) cracking
 (b) oxidation
 (c) hydrolysis
 (d) distillation under reduced pressure
- 44. Match List-I with List-II and select the correct answer from the given codes.**
- | List - I
(Reaction) | List - II
(Reagent/Catalyst) |
|-------------------------|--|
| A. Cannizaro reaction | 1. $\text{SnCl}_2 / \text{HCl}$ |
| B. Stephen's reaction | 2. NaOH |
| C. Clemmensen reduction | 3. $\text{Zn} / \text{Hg}-\text{conc. HCl}$ |
| D. Rosenmund's method | 4. $\frac{\text{Pd} / \text{BaSO}_4}{\text{Boiling xylene}}$ |
- Codes**
- | | | | | |
|-----|---|---|---|---|
| | A | B | C | D |
| (a) | 1 | 2 | 3 | 4 |
| (b) | 2 | 1 | 3 | 4 |
| (c) | 4 | 3 | 2 | 1 |
| (d) | 1 | 4 | 2 | 3 |

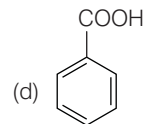
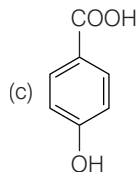
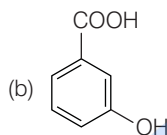
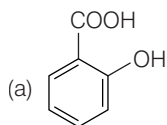
45. The correct order of ionic radius of nitrogen family is

- (a) $N^{3-} < P^{3-} < As^{3-} < Sb^{3-} < Bi^{3-}$
 (b) $N^{3-} < P^{3-} < Sb^{3-}$
 (c) $P^{3-} = As^{3-} > Bi^{3-}$
 (d) $N^{3-} > Bi^{3-} > Sb^{3-}$

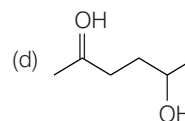
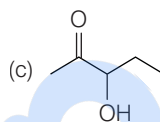
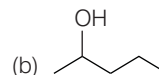
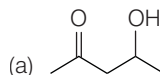
46. Which of the following statement is false?

- (a) Chlorophyll is responsible for the synthesis of carbohydrate in plants
 (b) In presence of oxygen, haemoglobin forms oxyhaemoglobin
 (c) Acetyl salicylic acid is known as aspirin
 (d) Vitamin B_{12} contains Mg^{2+} ion

47. Among following, compound with the lowest pK_a value, is



48. Which one of the following will most readily be dehydrated in acidic solution?



49. Paracetamol is a following drug

- (a) antipyretic (b) antiseptic
 (c) antibiotic (d) anaesthetic

50. $K_2[Hgl_4]$ detects the following ion

- (a) Cl^- (b) NO_2^- (c) NO_3^- (d) NH_4^+

Mathematics

1. If A and B are two such events that $P(A \cup B) = P(A \cap B)$, then which of the following is true?

- (a) $P(A) + P(B) = 0$
 (b) $P(A) + P(B) = P(A)P(B/A)$
 (c) $P(A) + P(B) = 2P(A)P(B/A)$
 (d) None of the above

2. Equation of tangent to the circle $x^2 + y^2 - 2x - 2y + 1 = 0$ perpendicular to $y = x$ is given by

- (a) $x + y \pm 1 = 0$ (b) $x + y = 2 \pm \sqrt{3}$
 (c) $x - y \pm 3 = 0$ (d) $x - y \pm 1 = 0$

3. If point D divides the base BC of a $\triangle ABC$ in the ratio $n : m$, then the value of $mBD^2 + nCD^2 + (m+n)AD^2$ is

- (a) $mAC^2 + nAB^2$
 (b) $(m+n)(AC^2 + AB^2)$
 (c) $nAC^2 + mAB^2$
 (d) None of the above

4. A man is standing on the horizontal plane. The angle of elevation of top of the pole is α . If he walks a distance double the height of the pole, then the elevation of the pole is 2α . The value of α is

- (a) $\frac{\pi}{12}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$

5. If $f(x) = \begin{cases} \frac{\sin[x]}{[x]} & \text{for } [x] \neq 0 \\ 0 & \text{for } [x] = 0 \end{cases}$

where, $[x]$ denotes the greatest integer less than or equal to x , then $\lim_{x \rightarrow 0} f(x)$ is equal to

- (a) 1 (b) -1
 (c) 0 (d) Does not exist

6. The value of the angle between two straight lines $y = (2 - \sqrt{3})x + 5$ and $y = (2 + \sqrt{3})x - 7$ is

- (a) 30° (b) 60°
 (c) 45° (d) 90°

7. Equation of a plane passing through $(-1, 1, 1)$ and $(1, -1, 1)$ and perpendicular to $x + 2y + 2z = 5$ is

(a) $2x + 3y - 3z + 3 = 0$
 (b) $x + y + 3z - 5 = 0$
 (c) $2x + 2y - 3z + 3 = 0$
 (d) $x + y + z - 3 = 0$

8. If $f'(x) > 0 \forall x \in R, f'(3) = 0$ and

$$g(x) = f(\tan^2 x - 2 \tan x + 4), 0 < x < \frac{\pi}{2}, \text{ then}$$

$g(x)$ is increasing in

(a) $\left(0, \frac{\pi}{4}\right)$ (b) $\left(\frac{\pi}{6}, \frac{\pi}{3}\right)$ (c) $\left(0, \frac{\pi}{3}\right)$ (d) $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

9. Probability of getting a total of 7 or 9 in a single throw of two dice is

(a) $\frac{5}{18}$ (b) $\frac{1}{6}$
 (c) $\frac{1}{9}$ (d) None of these

10. What is compiler?

(a) Application software (b) System software
 (c) Utility software (d) All of these

11. Let $f(x)$ be differentiable on the interval $(0, \infty)$ such that $f(1) = 1$ and

$$\lim_{t \rightarrow x} \frac{t^2 f(x) - x^2 f(t)}{t - x} = 1 \text{ for each } x > 0.$$

Then, $f(x)$ is equal to

(a) $\frac{1}{3x} + \frac{2}{3}x^2$ (b) $-\frac{x}{3} + \frac{4x^2}{3}$
 (c) $-\frac{1}{x}$ (d) $-\frac{1}{x} + \frac{2}{x^2}$

12. If $\int \sin \left\{ 2 \tan^{-1} \sqrt{\frac{1-x}{1+x}} \right\} dx$

$$= A \sin^{-1} x + B x \sqrt{1-x^2} + C,$$

then $A + B$ is equal to

(a) 10 (b) $\frac{1}{2}$
 (c) 1 (d) $-\frac{1}{2}$

13. The coefficient of x^4 in $(1 + x + x^3 + x^4)^{10}$ is

(a) 210 (b) 100
 (c) 310 (d) 110

14. The locus of centre of circles which cuts orthogonally the circle $x^2 + y^2 - 4x + 8 = 0$ and touches $x + 1 = 0$, is

(a) $y^2 + 6x + 7 = 0$ (b) $x^2 + y^2 + 2x + 3 = 0$
 (c) $x^2 + 3y + 4 = 0$ (d) None of the above

$$15. \text{ Let } f(x) = \begin{vmatrix} \sin 3x & 1 & 2\left(\cos \frac{3x}{2} + \sin \frac{3x}{2}\right)^2 \\ \cos 3x & -1 & 2\left(\cos^2 \frac{3x}{2} - \sin^2 \frac{3x}{2}\right) \\ \tan 3x & 4 & 1 + 2 \tan 3x \end{vmatrix}$$

Then, the value of $f'(x)$ at $x = (2n + 1)\pi, n \in I$ (the set of integers) is equal to

(a) $(-1)^n$ (b) $(-1)^{n+1}$
 (c) 3 (d) 9

16. The condition for the line $lx + my + n = 0$ to be a normal to $\frac{x^2}{25} + \frac{y^2}{9} = 1$ is

(a) $\frac{l^2}{9} + \frac{m^2}{25} = \frac{n^2}{256}$ (b) $\frac{9}{m^2} + \frac{25}{l^2} = \frac{256}{n^2}$
 (c) $\frac{l^2}{9} - \frac{m^2}{25} = \frac{n^2}{256}$ (d) None of these

17. The least value of a , for which the function $\frac{4}{\sin x} + \frac{1}{1 - \sin x} = a$ has atleast one solution in the interval $\left(0, \frac{\pi}{2}\right)$, is

(a) 9 (b) 4
 (c) 5 (d) 1

18. If one line of regression coefficient is less than unity, then the other will be

(a) less than unity (b) equal to unity
 (c) greater than unity (d) All of these

19. Three concurrent edges of a parallelopiped are given by

$$\mathbf{a} = 2\hat{\mathbf{i}} - 3\hat{\mathbf{j}} + \hat{\mathbf{k}},$$

$$\mathbf{b} = \hat{\mathbf{i}} - \hat{\mathbf{j}} + 2\hat{\mathbf{k}}$$

$$\text{and } \mathbf{c} = 2\hat{\mathbf{i}} + \hat{\mathbf{j}} - \hat{\mathbf{k}}.$$

The volume of the parallelopiped is

(a) 14 cu units (b) 20 cu units
 (c) 25 cu units (d) 60 cu units

20. Roots of equation $x^3 - 6x + 1 = 0$ lie in the interval
 (a) (2, 3) (b) (3, 4) (c) (3, 5) (d) (4, 6)
21. If $\lim_{x \rightarrow 0} \frac{\sin(\sin x) - \sin x}{ax^3 + bx^5 + c} = \frac{-1}{12}$, then
 (a) $a = 2, b \in R, c = 0$ (b) $a = -2, b \in R, c = 0$
 (c) $a = 1, b \in R, c = 0$ (d) $a = -1, b \in R, c = 0$
22. According to Newton-Raphson method, the value of $\sqrt{12}$ upto three places of decimal will be
 (a) 3.463 (b) 3.462
 (c) 3.467 (d) None of these
23. If $\frac{(3-i)^2}{2+i} = A + iB$, where A and B are real numbers, then A and B are equal to
 (a) $A = -4, B = 2$ (b) $A = 2, B = -4$
 (c) $A = 2, B = 4$ (d) None of these
24. The radical centre of the system of circles,
 $x^2 + y^2 + 4x + 7 = 0$,
 $2(x^2 + y^2) + 3x + 5y + 9 = 0$
 and $x^2 + y^2 + y = 0$ is
 (a) $(-2, -1)$ (b) $(1, -2)$
 (c) $(-1, -2)$ (d) None of these
25. The curve, for which the area of the triangle formed by X -axis, the tangent line at any point P and line OP is equal to a^2 , is given by
 (a) $y = x - Cx^2$ (b) $x = Cy \pm \frac{a^2}{y}$
 (c) $y = Cx \pm \frac{a^2}{x}$ (d) None of these
26. Solution of the equation
 $\cos^2 x \frac{dy}{dx} - (\tan 2x)y = \cos^4 x, |x| < \frac{\pi}{4}$, where
 $y\left(\frac{\pi}{6}\right) = \frac{3\sqrt{3}}{8}$, is given by
 (a) $y \frac{\tan 2x}{1 - \tan^2 x} = 0$ (b) $y(1 - \tan^2 x) = C$
 (c) $y = \sin 2x + C$ (d) $y = \frac{1}{2} \cdot \frac{\sin 2x}{1 - \tan^2 x}$
27. If $1, \omega$ and ω^2 are the cube roots of unity, then the value of $(1 - \omega + \omega^2)(1 + \omega - \omega^2)$ is equal to
 (a) 4 (b) 0
 (c) 2 (d) 3
28. The equation of the curve through the point $(1, 0)$, whose slope is $\frac{y-1}{x^2+x}$, is
 (a) $2x(y-1) + x + 1 = 0$
 (b) $(x+1)(y-1) + 2x = 0$
 (c) $x(y-1)(x+1) + 2 = 0$
 (d) $x(y+1) + y(x+1) = 0$
29. The number of points, where $f(x) = [\sin x + \cos x]$ (where $[\cdot]$ denotes the greatest integer function) and $x \in (0, 2\pi)$ is not continuous, is
 (a) 3 (b) 4 (c) 5 (d) 6
30. The value of $\cot^{-1} \left(\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right)$ is equal to
 (a) $\frac{x}{3}$ (b) $\frac{x}{4}$ (c) 1 (d) $\frac{x}{2}$
31. If $A(-1, 3, 2)$, $B(2, 3, 5)$ and $C(3, 5, -2)$ are vertices of a $\triangle ABC$, then angles of $\triangle ABC$ are
 (a) $\angle A = 90^\circ, \angle B = 30^\circ, \angle C = 60^\circ$
 (b) $\angle A = \angle B = \angle C = 60^\circ$
 (c) $\angle A = \angle B = 45^\circ, \angle C = 90^\circ$
 (d) None of the above
32. $\lim_{x \rightarrow 0} \frac{\int_0^{x^2} \sin \sqrt{t} dt}{x^3}$ is equal to
 (a) $\frac{2}{3}$ (b) $\frac{1}{3}$ (c) 0 (d) ∞
33. If $\mathbf{a}, \mathbf{b}$ and $\mathbf{c}$ are three non-coplanar vectors, then $[\mathbf{a} \times \mathbf{b}, \mathbf{b} \times \mathbf{c}, \mathbf{c} \times \mathbf{a}]$ is equal to
 (a) $[\mathbf{a} \ \mathbf{b} \ \mathbf{c}]^3$ (b) $[\mathbf{a} \ \mathbf{b} \ \mathbf{c}]^2$
 (c) 0 (d) None of these
34. If geometric mean and harmonic mean of two numbers a and b are 16 and $64/5$ respectively, then the value of $a : b$ is
 (a) 4 : 1 (b) 3 : 2 (c) 2 : 3 (d) 1 : 4
35. If the sum of four numbers in GP is 60 and the arithmetic mean of the first and last numbers is 18, then the numbers are
 (a) 3, 9, 27, 81 (b) 4, 8, 16, 32
 (c) 2, 6, 18, 54 (d) None of these
36. The sum of the real solutions of equation $2|x|^2 + 51 = |1 + 20x|$ is
 (a) 5 (b) 24
 (c) 0 (d) None of these

37. The quadratic equation whose roots are $\frac{1}{3+\sqrt{2}}$ and $\frac{1}{3-\sqrt{2}}$, will be

- (a) $7x^2 - 6x + 1 = 0$ (b) $6x^2 - 7x + 1 = 0$
(c) $x^2 - 6x + 7 = 0$ (d) $x^2 - 7x + 6 = 0$

38. Who said, "Number of transistors per square inch on integrated circuits double every year, since their invention will continue to do so in the foreseeable future"?

- (a) Alan Turing (b) Jon Von Neumann
(c) Herbert Simon (d) Gordon Moore

39. The number of vectors of unit length perpendicular to vectors $\mathbf{a} = \hat{i} + \hat{j}$ and $\mathbf{b} = \hat{j} + \hat{k}$, is

- (a) infinite (b) one (c) two (d) three

40. By trapezoidal rule, the approximate value of the integral $\int_0^6 \frac{dx}{1+x^2}$ is

- (a) 1.3128 (b) 1.4108
(c) 1.4218 (d) None of these

41. The radius of a cylinder is increasing at the rate of 2 m/s and its height is decreasing at the rate of 3 m/s. When the radius is 3 m and height is 5 m, then the volume of the cylinder would change at the rate of

- (a) $87\pi \text{ m}^3/\text{s}$ (b) $33\pi \text{ m}^3/\text{s}$
(c) $27\pi \text{ m}^3/\text{s}$ (d) $15\pi \text{ m}^3/\text{s}$

42. The point on the straight line $y = 2x + 11$ which is nearest to the circle $16(x^2 + y^2) + 32x - 8y - 50 = 0$, is

- (a) $\left(\frac{9}{2}, 2\right)$ (b) $\left(\frac{9}{2}, -2\right)$ (c) $\left(-\frac{9}{2}, 2\right)$ (d) $\left(-\frac{9}{2}, -2\right)$

43. The locus of the extrimities of the latusrectum of the family of ellipses $b^2x^2 + y^2 = a^2b^2$ having a given major axis, is

- (a) $x^2 \pm ay = a^2$ (b) $y^2 \pm bx = a^2$
(c) $x^2 \pm by = a^2$ (d) $y^2 \pm ax = b^2$

44. The solution of differential equation $(y \log x - 1)ydx = xdy$ is

- (a) $y(\log e^x + Cx) = 1$ (b) $\left(\log \frac{x}{e} + Cx\right)x = y$
(c) $(\log Cx^2 + ex^2)y = x$ (d) None of these

45. If m things are distributed among a men and b women. Then, the chance that the number of things received by men is odd, is

- (a) $\frac{(b-a)^m - (b+a)^m}{2(b+a)^m}$ (b) $\frac{(b+a)^m - (b-a)^m}{2(b+a)^m}$
(c) $\frac{(b+a)^m - (b-a)^m}{(b+a)^m}$ (d) None of these

46. The solution of the differential equation $\sqrt{a+x} \frac{dy}{dx} + xy = 0$ is

- (a) $y = Ce^{\frac{2}{3}(2a-x)\sqrt{x+a}}$ (b) $y = Ce^{\frac{2}{3}(a-x)\sqrt{x+a}}$
(c) $y = Ce^{\frac{2}{3}(2a+x)\sqrt{x+a}}$ (d) $y = Ce^{-\frac{2}{3}(2a-x)\sqrt{x+a}}$

47. The values of a , if $f(x) = 2e^x - ae^{-x} + (2a+1)x - 3$ increases x , are in

- (a) $[0, \infty)$ (b) $(-\infty, 0]$
(c) $(-\infty, \infty)$ (d) $(1, \infty)$

48. By Newton-Raphson method, the positive root of the equation $x^4 - x - 10 = 0$ is

- (a) 1.871 (b) 1.868
(c) 1.856 (d) None of these

49. In $\triangle ABC$, if $3a = b + c$, then value of

$\cot \frac{B}{2} \cot \frac{C}{2}$ will be

- (a) 1 (b) 2 (c) $\sqrt{3}$ (d) $\sqrt{2}$

50. If $\sin^{-1}x + \cot^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{2}$, then value of x will be

- (a) 0 (b) $\frac{1}{\sqrt{5}}$ (c) $\frac{2}{\sqrt{5}}$ (d) $\frac{\sqrt{3}}{2}$

51. The value of $\int_0^{\sqrt{\ln(\pi/2)}} \cos(e^{x^2}) 2x e^{x^2} dx$ is

- (a) 1 (b) $1 + \sin 1$
(c) $1 - \sin 1$ (d) $(\sin 1) - 1$

52. API stands for

- (a) Access Programming Interface
(b) Android Programming Interface
(c) Application Programming Interface
(d) None of the above

53. If $Z = i \log(2 - \sqrt{3})$, then the value of $\cos Z$ will be

- (a) i (b) $2i$ (c) 1 (d) 2

54. $\lim_{x \rightarrow 2} \frac{2 - \sqrt{2+x}}{2^{1/3} - (4-x)^{1/3}}$ is equal to
 (a) $2 \cdot 3^{-1/2}$ (b) $3 \cdot 2^{-4/3}$
 (c) $-3 \cdot 2^{-4/3}$ (d) None of these
55. The three lines of a triangle are given by $(x^2 - y^2)(2x + 3y - 6) = 0$. If the point $(-2, \lambda)$ lies inside and $(\mu, 1)$ lies outside the triangle, then
 (a) $\lambda \in \left(1, \frac{10}{3}\right); \mu \in (-3, 5)$
 (b) $\lambda \in \left(2, \frac{10}{3}\right); \mu \in (-1, 1)$
 (c) $\lambda \in \left(-1, \frac{9}{2}\right); \mu \in \left(-2, \frac{10}{3}\right)$
 (d) None of the above
56. System software : Utility software : :
 (a) Operating system: Anti-virus
 (b) Anti-virus : Operating system
 (c) Anti-virus : MS office
 (d) MS office : Anti-virus
57. The number of common tangents to two circles $x^2 + y^2 = 4$ and $x^2 + y^2 - 8x + 12 = 0$ is
 (a) 1 (b) 2 (c) 3 (d) 4
58. If $2a + 3b + 6c = 0$, then the equation $ax^2 + bx + c = 0$ has atleast one real root in
 (a) $(0, 1)$ (b) $\left(0, \frac{1}{2}\right)$
 (c) $\left(\frac{1}{4}, \frac{1}{2}\right)$ (d) None of these
59. If for all $x, y \in \mathbb{N}$, there exists a function $f(x)$ satisfying $f(x+y) = f(x) \cdot f(y)$ such that $f(1) = 3$ and $\sum_{x=1}^n f(x) = 120$, then value of n will be
 (a) 4 (b) 5
 (c) 6 (d) None of these
60. If $f(x) = \begin{cases} \sin\left(\frac{\pi x}{2}\right), & \text{if } x < 1 \\ 3 - 2x, & \text{if } x \geq 1 \end{cases}$, then $f(x)$ has
 (a) local minimum at $x = 1$
 (b) local maximum at $x = 1$
 (c) Both local maximum and local minimum at $x = 1$
 (d) None of the above
61. The general solution of the differential equation $\frac{dy}{dx} = y \tan x - y^2 \sec x$ is
 (a) $\tan x = (C + \sec x)y$ (b) $\sec y = (C + \tan y)x$
 (c) $\sec x = (C + \tan x)y$ (d) $\tan y = (C + \sec x)x$
62. The values of λ such that $(x, y, z) \neq (0, 0, 0)$ and $(\hat{i} + \hat{j} + 3\hat{k})x + (3\hat{i} - 3\hat{j} + \hat{k})y + (-4\hat{i} + 5\hat{j})z = \lambda(\hat{i}x + \hat{j}y + \hat{k}z)$ are
 (a) 0, 1 (b) -1, 1 (c) -1, 0 (d) -2, 0
63. In $\triangle ABC$, if $\cot A, \cot B$ and $\cot C$ are in AP, then a^2, b^2 and c^2 are in
 (a) HP (b) AP
 (c) GP (d) None of these
64. By Simpson's $\frac{1}{3}$ -rd rule, the approximate value of the integral $\int_1^2 e^{-x/2} dx$ using four intervals, is
 (a) 0.377 (b) 0.487 (c) 0.477 (d) 0.387
65. A die is rolled three times. The probability of getting a larger number than the previous number is
 (a) $\frac{5}{216}$ (b) $\frac{5}{54}$ (c) $\frac{1}{6}$ (d) $\frac{5}{36}$
66. If $f(x) = \log_e(6 - |x^2 + x - 6|)$, then domain of $f(x)$ has how many integral values of x ?
 (a) 5 (b) 4
 (c) Infinite (d) None of these
67. The graph of the equation $y^2 + z^2 = 0$ in three dimensional space is
 (a) YZ-plane (b) Z-axis (c) Y-axis (d) X-axis
68. If $Z_1 = 1 + i, Z_2 = -2 + 3i$ and $Z_3 = \frac{ai}{3}$ are collinear, where $i^2 = -1$, then the value of a will be
 (a) -1 (b) 3 (c) 4 (d) 5
69. If a, b and c are in HP, then for any $n \in \mathbb{N}$, which one of the following is true?
 (a) $a^n + c^n < 2b^n$ (b) $a^n + c^n > 2b^n$
 (c) $a^n + c^n = 2b^n$ (d) None of these
70. The value of $\tan\left[2 \tan^{-1}\left(\frac{1}{5}\right) - \frac{\pi}{4}\right]$ is
 (a) $\frac{17}{7}$ (b) $\frac{-17}{7}$ (c) $\frac{7}{17}$ (d) $\frac{-7}{17}$

English and General Aptitude

Directions (Q. Nos. 1-5) *Read the given passage carefully and answer the questions that follow by selecting the most appropriate option.*

No one knows when or by whom rockets were invented. In all probability the rocket was not suddenly invented but evolved gradually over a long period of time, perhaps in different parts of the world at the same time. Some historians of rocketry, notably Willy Ley, trace the development of rockets to the 13th century China, a land noted in ancient times for its fire work display. In the year 1232 AD when the Mongols laid siege to the city of Kai-Feng Fu, the capital of Honan province, the Chinese defenders used weapons that were described as "arrows of flying fire". There is no explicit statement that these arrows were rockets, but some students have concluded that they were because the record does not mention bows or other means of shooting the arrows. In the same battle, we read, the defenders dropped from the walls of the city a kind of bomb described as "heaven-shaking thunder". From these meagre references some students have concluded that the Chinese, by the year 1232 had discovered gunpowder and had learned to use it to make explosive bombs as well as propulsive charges for rockets.

1. The passage gives primarily a history of
 - (a) the bravery of the Chinese
 - (b) the invention of rockets
 - (c) the attack on China by the Mongols
 - (d) the battle against the Chinese wall
2. According to this passage, rockets were invented by
 - (a) Willy Ley
 - (b) unknown people
 - (c) the Mongols
 - (d) the ruler of Honan province
3. According to this passage, rockets were
 - (a) a gift of God to the Chinese
 - (b) invented in the twentieth century
 - (c) invented in 1232 AD
 - (d) developed over many centuries
4. The phrase 'arrows of flying fire'
 - (a) means some ancient phenomenon in the skies
 - (b) refers to lightning and thunder
 - (c) is another name for rockets
 - (d) is assumed to refer to rockets

5. The bombs have been referred to as "heaven shaking thunder" because they
 - (a) contain gunpowder
 - (b) make thunderous noise
 - (c) are propelled by rockets
 - (d) seem to fall from heaven

Directions (Q. Nos. 6-8) *Complete the following sentence(s) with an appropriate word.*

6. The lawyer has plenty of
 - (a) criminals
 - (b) buyers
 - (c) customers
 - (d) clients
7. "I have brought the book. It's!" Ravi said assertively to all the boys present.
 - (a) mine
 - (b) my
 - (c) me
 - (d) myself
8. "The project is good, but there is missing to make it an excellent work," the engineer commented.
 - (a) everything
 - (b) anything
 - (c) something
 - (d) nothing

Directions (Q. Nos. 9-12) *In the following questions, select the antonym of the given words.*

9. Stingy
 - (a) Clean
 - (b) Tight
 - (c) Generous
 - (d) Cheap
10. Barren
 - (a) Fertile
 - (b) Rich
 - (c) Prosperous
 - (d) Positive
11. Virtue
 - (a) Vice
 - (b) Failure
 - (c) Fault
 - (d) Offence
12. Nervous
 - (a) Flawless
 - (b) Immature
 - (c) Smooth
 - (d) Composed

Directions (Q. Nos. 13-15) *In the following questions, choose the alternative which best expresses the meaning of the word given in capital letters.*

13. Savour
 - (a) Taste
 - (b) Protector
 - (c) Sour
 - (d) Flavour

14. Rivalled

- (a) Hatred (b) Revised
(c) Competed (d) Contradicted

15. Trimming

- (a) Skimming (b) Arranging
(c) Planning (d) Cutting

Directions (Q. Nos. 16-20) *In each of the following questions, there is a certain relationship between two given words on side of (::) and one word is given on another side (::) while another word is to be found from the given alternatives, having the same relation with this word as the words of the given pair bear. Choose the correct alternative.*

16. Donkey : Brays :: Wolf : ?

- (a) Bellows (b) Howls
(c) Whimpers (d) Roars

17. Astronauts : Space :: Argonauts : ?

- (a) Fire (b) Ship
(c) Treasure (d) Sea

18. Orthopaedic : Bones :: Dermatologist : ?

- (a) Feet (b) Skin
(c) Heart (d) Lungs

19. Basilica : Church :: Dormer : ?

- (a) Window (b) Chapel
(c) Movie (d) Servant

20. Although : Nevertheless :: Though : ?

- (a) Therefore (b) Yet
(c) However (d) Simultaneously

Directions (Q. Nos. 21-23) *In each of the following questions, a group of four words are given. Choose the word which is odd.*

21. Find the odd word.

- (a) Sun (b) Mercury (c) Mars (d) Venus

22. Find the odd word.

- (a) Stneng (b) Hesitant
(c) Daring (d) Brave

23. Find the odd word.

- (a) Marigold (b) Tulip
(c) Lotus (d) Rose

24. In the English alphabet, find the position of P from right.

- (a) 12 (b) 13 (c) 10 (d) 11

25. Which of the following letters is 14th to the right of 6th letter from the left in the English alphabet?

- (a) R (b) P (c) W (d) T

26. If English alphabet is written in backward order, then what will be the 13th letter to the left of the 3rd letter from right?

- (a) P (b) N (c) R (d) Q

Directions (Q. Nos. 27-28) *In the following series, replace the question mark (?) with the suitable option.*

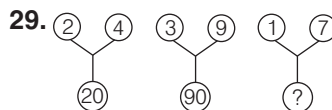
27. 23, 28, 34, 41, 49, ?

- (a) 57 (b) 59 (c) 56 (d) 58

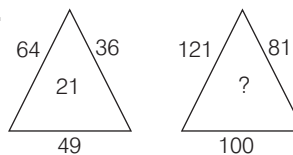
28. 11, 13, 17, 19, 23, 25, ?

- (a) 29 (b) 27 (c) 31 (d) 37

Directions (Q. Nos. 29-30) *In each of the following questions, a set of figures carrying certain characters is given. Assuming that the characters in each set follow a similar pattern, find the missing character in each case.*



- (a) 160 (b) 100 (c) 50 (d) 75

30.

- (a) 40 (b) 30 (c) 20 (d) 10