

TG PGECET 2025

Hall Ticket Number	
Candidate Name	
Test Center Name	
Test Date	17/06/2025
Test Time	10:00 AM - 12:00 PM
Subject	Mechanical Engineering

Section : Mathematics

Q.1 $f(x, y) = x^2 + y^2 + 6x + 12$ has

- Ans
- ☒ 1. Minimum value 3 at (3,0)
 - ☒ 2. Maximum value 3 at (-3,0)
 - ☒ 3. Minimum value 3 at (-3,0)
 - ☒ 4. Maximum value 3 at (3,0)

Question ID : 3084112883

Chosen Option : 1

Q.2 The order of the pole of $\frac{1}{z - \sin z}$ is

- Ans
- ☒ 1. 0
 - ☒ 2. 2
 - ☒ 3. 3
 - ☒ 4. 1

Question ID : 3084112887

Chosen Option : 2

Q.3 If $\vec{F} = (x^2 - y^2)\vec{i} - 2xy\vec{j}$, then $\int_C \vec{F} \cdot d\vec{r}$ over the boundary C of the rectangle formed by the lines $x = 0$, $x = a$, $y = 0$ and $y = b$ is

- Ans
- ☒ 1. 1
 - ☒ 2. $-ab$
 - ☒ 3. 0
 - ☒ 4. $2ab$

Question ID : 3084112884

Chosen Option : 2

Q.4 If the Laplace transform of a function $f(t)$ is given by $\frac{s+3}{(s+1)(s+2)}$ then $f(0)$ is

- Ans
- ☒ 1. 1
 - ☒ 2. 0
 - ☒ 3. $2e^{-t} - e^{-2t}$
 - ☒ 4. $e^{-2t} - e^{-t}$

Question ID : 3084112886

Chosen Option : 1

Q.5

Let X be a random variable with density function $f(x) = \begin{cases} \frac{x^2}{3}, & -1 < x < 2, \\ 0, & \text{otherwise} \end{cases}$,

then the expected value of $g(x) = 4x + 3$ is

- Ans
- ☒ 1. 10
 - ☒ 2. 8
 - ☒ 3. 3
 - ☒ 4. 4

Question ID : 3084112888
Chosen Option : 2

Q.6

An eigenvector of the matrix $\begin{pmatrix} 1 & 5 & 3 \\ 0 & 4 & 4 \\ 0 & 0 & 2 \end{pmatrix}$ is

- Ans
- ☒ 1. $\begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}$
 - ☒ 2. $\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$
 - ☒ 3. $\begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}$
 - ☒ 4. $\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$

Question ID : 3084112882
Chosen Option : 4

Q.7

If $A = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ then the rank of $A^T A$ is

- Ans
- ☒ 1. 4
 - ☒ 2. 2
 - ☒ 3. 1
 - ☒ 4. 3

Question ID : 3084112881
Chosen Option : 2

Q.8 Consider the initial value problem $\frac{dy}{dx} = 2x - y, y(0) = 0$. The value of $y(1)$ is

- Ans
- ☒ 1. 2
 - ☒ 2. e^2
 - ☒ 3. $\frac{2}{e}$
 - ☒ 4. e

Question ID : 3084112885
Chosen Option : 4

Q.9 The equation $x^3 - 2x - 5 = 0$ is converted into the form $x = \phi(x)$ so as to apply the method of iteration to solve it with the initial approximation $x_0 = 2$, then $\phi(x) =$

- Ans
- ☒ 1. $(2x+5)^{\frac{1}{2}}$
 - ☒ 2. $(x^2+5)^{\frac{1}{3}}$
 - ☒ 3. $(2x+5)^{\frac{1}{3}}$
 - ☒ 4. $\frac{x^2+5}{2}$

Question ID : 3084112890
Chosen Option : 3

Q.10 If X and Y are independent Poisson variates such that $P(X=1) = P(X=2)$ and $P(Y=2) = P(Y=3)$ then the variance of $X - 2Y$ is

- Ans
- ☒ 1. 13
 - ☒ 2. 14
 - ☒ 3. 12
 - ☒ 4. 0

Question ID : 3084112889
Chosen Option : 3

Section : Mechanical Engineering

Q.11 A 20° full depth involute profile gear pair has 19 tooth on pinion and 37 tooth on gear are in mesh. If the module is 5 mm, then the centre distance between gear pair is

- Ans
- ☒ 1. 300 mm
 - ☒ 2. 280 mm
 - ☒ 3. 140 mm
 - ☒ 4. 150 mm

Question ID : 3084112918
Chosen Option : 4

Q.12 Maximum distortion energy theory for the failure of a material with in elastic limits is also known as

- Ans
- ☒ 1. Von Mises theory
 - ☐ 2. Guest theory
 - ☐ 3. Tresca theory
 - ☐ 4. Rankine theory

Question ID : 3084112916
Chosen Option : 4

Q.13 The thermal efficiency of Brayton cycle in comparison with Otto cycle for the same compression process is

- Ans
- ☐ 1. Lower
 - ☒ 2. Equal
 - ☐ 3. Dependent on inlet temperature
 - ☐ 4. Higher

Question ID : 3084112939
Chosen Option : 3

Q.14 An electric cable of aluminum conductor with thermal conductivity 240 W/m K is to be insulated with rubber with thermal conductivity 0.1 W/m K . The cable is to be located in air with heat transfer coefficient of $6 \text{ W/m}^2 \text{ K}$, then critical radius of insulation is

- Ans
- ☐ 1. 50.6 mm
 - ☐ 2. 32.6 mm
 - ☐ 3. 25.6 mm
 - ☒ 4. 16.6 mm

Question ID : 3084112930
Chosen Option : 3

Q.15 The heat treatment method, which is used to increase the toughness and simultaneously reduce the brittleness is known as

- Ans
- ☐ 1. Annealing
 - ☐ 2. Normalizing
 - ☒ 3. Tempering
 - ☐ 4. Case hardening

Question ID : 3084112958
Chosen Option : 1

Q.16 The Prandtl number plays the critical role in the relative growth of the hydrodynamic and thermal boundary layers. If the Prandtl number is greater than one, then

- Ans
- ☒ 1. Both the boundary layers grow at the same rate
 - ☒ 2. Growth rates of boundary layers are unrelated
 - ☒ 3. Thermal boundary layer grows faster than the hydrodynamic boundary layer
 - ☒ 4. Hydrodynamic boundary layer grows faster than the thermal boundary layer

Question ID : 3084112933
Chosen Option : 3

Q.17 Which of the following is not a liquid based additive manufacturing system?

- Ans
- ☒ 1. Solid Ground Curing
 - ☒ 2. Stereo Lithography Apparatus
 - ☒ 3. Laminated Object Manufacturing
 - ☒ 4. Solid Object Ultraviolet laser Printer

Question ID : 3084112985
Chosen Option : 3

Q.18 The minimum number of teeth on standard gear for involute rack in order to avoid interference with pressure angle ' α ' is given by

- Ans
- ☒ 1. $2\sin^2 \alpha$
 - ☒ 2. $\sin^2 \alpha$
 - ☒ 3. $\frac{1}{\sin^2 \alpha}$
 - ☒ 4. $\frac{2}{\sin^2 \alpha}$

Question ID : 3084112909
Chosen Option : 2

Q.19 If ' ω ' is frequency of forced vibrations of a system whose natural frequency is ' ω_n ', when $\omega / \omega_n > \sqrt{2}$,

- Ans
- ☒ 1. Neither dampers nor stops may be used
 - ☒ 2. Dampers should not be used but stops may be provided
 - ☒ 3. Dampers must be used
 - ☒ 4. Either dampers or stops may be used

Question ID : 3084112913
Chosen Option : 2

Q.20 In the normalizing process, the treatment involves

- Ans
- ☐ 1. Slow cooling rate and no extended cooling period
 - ☐ 2. Rapid cooling rate and extended cooling period
 - ☒ 3. Rapid cooling rate and no extended cooling period
 - ☐ 4. Slow cooling rate and extended cooling period

Question ID : 3084112956
Chosen Option : 2

Q.21 The corrosion of metals at the joints is being minimized by joining dissimilar metals with adhesives because

- Ans
- ☐ 1. Adhesives prevent the exposure to atmosphere
 - ☒ 2. Direct metal to metal contact is avoided
 - ☐ 3. Adhesive acts as a lubricator at the joints
 - ☐ 4. Metals are covered with adhesives

Question ID : 3084112971
Chosen Option : 2

Q.22 In inventory control theory, the economic order quantity is

- Ans
- ☐ 1. Average level of inventory
 - ☐ 2. Capacity of warehouse
 - ☒ 3. Optimum lot size
 - ☐ 4. Lot size corresponding to break even analysis

Question ID : 3084112991
Chosen Option : 1

Q.23 The type of transducer used in Ultrasonic non-traditional machining process is

- Ans
- ☐ 1. Superconductor
 - ☒ 2. Piezoelectric
 - ☐ 3. Semi-quartz
 - ☐ 4. Electrostatic

Question ID : 3084112975
Chosen Option : 2

Q.24 For the given number of members (m) and the number of joints (j), the following condition has to be satisfied so that the given frame is a redundant one.

- Ans
- ☐ 1. $m = 2j$
 - ☐ 2. $m = 2j - 3$
 - ☒ 3. $m > 2j - 3$
 - ☐ 4. $m < 2j - 3$

Question ID : 3084112894
Chosen Option : 2

Q.25 The local Nusselt number for the flow over a flat plate for laminar flow is being given by the empirical relation as

- Ans
- ☐ 1. $0.112 \text{ Re}^{0.5} \text{ Pr}^{0.333}$
 - ☐ 2. $0.221 \text{ Re}^{0.5} \text{ Pr}^{0.333}$
 - ☒ 3. $0.332 \text{ Re}^{0.5} \text{ Pr}^{0.333}$
 - ☐ 4. $0.664 \text{ Re}^{0.5} \text{ Pr}^{0.333}$

Question ID : 3084112932
Chosen Option : 2

Q.26 Which of the following factors does not influence the level of safety stock in an inventory control system?

- Ans
- ☐ 1. Lead time variability
 - ☐ 2. Demand variability
 - ☒ 3. Inventory turnover ratio
 - ☐ 4. Supplier reliability

Question ID : 3084112988
Chosen Option : 1

Q.27 A rectangular block of 2 m long, 1 m wide and 1 m height floats in the water. The specific weight of water is given as 10 kN/m^3 . If the block is immersed 0.5 m depth in the water, then the weight of the block is

- Ans
- ☐ 1. 15 kN
 - ☒ 2. 10 kN
 - ☐ 3. 20 kN
 - ☐ 4. 5 kN

Question ID : 3084112928
Chosen Option : 3

Q.28 Which of the following thermodynamic relation is used to determine the variation of latent heat at saturation pressure and temperature during phase change?

- Ans
- ☐ 1. Carnot relation
 - ☐ 2. Rankine – Hougoniot's relation
 - ☐ 3. Joule's Thompson relation
 - ☒ 4. Clausius Clapeyron relation

Question ID : 3084112943
Chosen Option : 4

Q.29 ABC analysis of inventory control system depends on

- Ans
- ☒ 1. Cost of materials
 - ☒ 2. Quantity of materials
 - ☒ 3. Annual consumption value of materials
 - ☒ 4. Quality of materials

Question ID : 3084112993
Chosen Option : 3

Q.30 In SI Engine, the spark is initiated before TD

- Ans
- ☒ 1. To minimize the work for compression
 - ☒ 2. To improve the chemical reaction
 - ☒ 3. To improve the compression ratio and expansion ratio
 - ☒ 4. To optimize the combustion soon after the piston reaches the top dead center

Question ID : 3084112948
Chosen Option : 3

Q.31 If a lead ball with a certain velocity is made to strike on a wall, then it falls down. But if a rubber ball of same mass and same velocity strikes the same wall, it rebounds. The reason is

- Ans
- ☒ 1. Change of momentum is zero for the rubber ball
 - ☒ 2. Change in momentum attained by the rubber ball is more than that of the lead ball.
 - ☒ 3. Both the balls undergo an equal change in momentum
 - ☒ 4. Change in momentum attained by the rubber ball is less than that of the lead ball.

Question ID : 3084112892
Chosen Option : 1

Q.32 The type of force acting on the die during metal forging operation is

- Ans
- ☒ 1. Compressive force
 - ☒ 2. Gravitational force
 - ☒ 3. Shear force
 - ☒ 4. Tensile force

Question ID : 3084112966
Chosen Option : 2

Q.33 A Pelton wheel develops 1750 kW of power under a head of 100 m while running at 200 rpm and discharging 2500 litres/s of water. The unit power of the wheel is

- Ans ☒ 1. 1.75 kW
☐ 2. 0.25 kW
☐ 3. 3.75 kW
☐ 4. 0.75 kW

Question ID : 3084112952
Chosen Option : 4

Q.34 The process of converting the STL file model into layers in rapid prototyping is known as

- Ans ☐ 1. Trimming
☐ 2. Cutting
☒ 3. Slicing
☐ 4. Chopping

Question ID : 3084112984
Chosen Option : 3

Q.35 In manufacturing management, the term dispatching is used to describe

- Ans ☒ 1. Dispatch of finished product
☐ 2. Dispatch of factory mail
☐ 3. Dispatch of sales order
☐ 4. Dispatch of work order through shop floor

Question ID : 3084112989
Chosen Option : 1

Q.36 The radius of Mohr's circle gives the value of

- Ans ☐ 1. Minimum Principal stress
☐ 2. Maximum Principal stress
☒ 3. Maximum Shear stress
☐ 4. Minimum Shear stress

Question ID : 3084112902
Chosen Option : 2

Q.37 The ratio of tensions (T_1/T_2) of tight and slack sides of a band and block brake in terms of coefficient of friction (μ), semi-angle (θ) of each block subtending at the centre of the drum and the number (n) of blocks is given by

Ans

✗ 1. $\left[\frac{(1 - \mu \tan \theta)}{(1 + \mu \tan \theta)} \right]^n$

✗ 2. $e^{\mu \theta n}$

✗ 3. $(\mu \theta)^n$

✓ 4. $\left[\frac{(1 + \mu \tan \theta)}{(1 - \mu \tan \theta)} \right]^n$

Question ID : 3084112920

Chosen Option : 1

Q.38 When a rectangular bar of length 'l', breadth 'b', thickness 't' and modulus of elasticity 'E' is subjected to an axial pull of 'P', then linear strain (ϵ) is

Ans

✗ 1. $\frac{bt}{PE}$

✗ 2. $\frac{PE}{bt}$

✗ 3. $\frac{btE}{P}$

✓ 4. $\frac{P}{btE}$

Question ID : 3084112897

Chosen Option : 3

Q.39 In vapour compression refrigeration system, during the compression process the

Ans ✗ 1.

Enthalpy before compression is same as enthalpy after the compression

✓ 2.

Entropy before compression is same as entropy after the compression

✗ 3.

Temperature before compression is same as temperature after the compression

✗ 4.

Internal energy before compression is same as internal energy after the compression

Question ID : 3084112950

Chosen Option : 3

Q.40 A governor is said to be stable, if the

Ans ☒ 1.

Radius of rotation of balls increases as the equilibrium speed increases

☒ 2.

Radius of rotation of balls increases as the equilibrium speed decreases

☒ 3.

Radius of rotation of balls decreases as the equilibrium speed increases

☒ 4.

Radius of rotation of balls decrease as the equilibrium speed decreases

Question ID : 3084112911
Chosen Option : 2

Q.41 A 0.5 kg weight attached to a light spring elongates by 0.981 mm. The natural frequency of the system should be

Ans ☒ 1. 26 Hz

☒ 2. 16 Hz

☒ 3. 6 Hz

☒ 4. 32 Hz

Question ID : 3084112912
Chosen Option : 1

Q.42 A beam is considered as flexurally strongest, then it has the

Ans ☒ 1. Maximum area of cross section

☒ 2. Maximum section modulus

☒ 3. Maximum bending stress

☒ 4. Maximum moment of inertia

Question ID : 3084112898
Chosen Option : 4

Q.43 One of the basic important objective of inventory management is

Ans ☒ 1. To examine the material availability in the market

☒ 2.

To go in person to the market and purchase the materials

☒ 3.

Personally check how the material used in different departments

☒ 4.

To employ the available capital efficiently so as to yield maximum results

Question ID : 3084112994
Chosen Option : 3

Q.44 In a single plate clutch with uniform wear, the total frictional torque transmitted is being calculated as

- Ans
- ☒ 1. $0.667 \mu W (r_1 - r_2)$
 - ☒ 2. $0.667 \mu W (r_1 + r_2)$
 - ☒ 3. $0.5 \mu W (r_1 - r_2)$
 - ☒ 4. $0.5 \mu W (r_1 + r_2)$

Question ID : 3084112921
Chosen Option : 2

Q.45 The volume percentage of Carbon at eutectic point in Iron-Iron carbide phase diagram is

- Ans
- ☒ 1. 2.1
 - ☒ 2. 4.3
 - ☒ 3. 0.83
 - ☒ 4. 0.02

Question ID : 3084112959
Chosen Option : 2

Q.46 The algebraic difference between the maximum limit and the basic size is known as

- Ans
- ☒ 1. Actual deviation
 - ☒ 2. Fundamental deviation
 - ☒ 3. Upper deviation
 - ☒ 4. Lower deviation

Question ID : 3084112979
Chosen Option : 2

Q.47 A ball of mass 1.0 kg falls vertically onto the floor with a speed of 25 m/s. If it bounds with an initial speed of 10 m/s, then the impulse action on the ball during contact is

- Ans
- ☒ 1. 35 N-s
 - ☒ 2. 45 N-s
 - ☒ 3. 15 N-s
 - ☒ 4. 25 N-s

Question ID : 3084112895
Chosen Option : 3

Q.48 The correct order of the coordinate number in BCC, FCC and HCP unit cell is

- Ans
- ☒ 1. 12, 8, 6
 - ☒ 2. 6, 8, 12
 - ☒ 3. 8, 12, 12
 - ☒ 4. 12, 8, 12

Question ID : 3084112955
Chosen Option : 1

Q.49 The average height from a mean line of all ordinates of the surface, regardless of sign is known as

- Ans
- ☒ 1. R_z value
 - ☒ 2. R_a value
 - ☒ 3. R_m value
 - ☒ 4. RMS value

Question ID : 3084112982

Chosen Option : 4

Q.50 The internal hot tear defects in casting are being inspected by

- Ans
- ☒ 1. Damping test
 - ☒ 2. Radiography
 - ☒ 3. Hardness test
 - ☒ 4. Visual inspection

Question ID : 3084112961

Chosen Option : 4

Q.51 The gases and vapours behave like ideal gas generally when its properties are at

- Ans
- ☒ 1. Low pressure and high temperature
 - ☒ 2. High pressure and high temperature
 - ☒ 3. High pressure and low temperature
 - ☒ 4. Low pressure and low temperature

Question ID : 3084112938

Chosen Option : 4

Q.52 Bernoulli's equation has been derived from the principle of

- Ans
- ☒ 1. Conservation of energy
 - ☒ 2. Conservation of mass
 - ☒ 3. Conservation of momentum
 - ☒ 4. Conservation of concentration

Question ID : 3084112926

Chosen Option : 1

Q.53 The ability of a material to undergo large permanent deformation with the application of a tensile force is known as

- Ans
- ☒ 1. Ductility
 - ☒ 2. Toughness
 - ☒ 3. Strength
 - ☒ 4. Resilience

Question ID : 3084112954

Chosen Option : 1

Q.54 Number of minimum control points required to generate a quadratic B-spline curve is

- Ans
- ☒ 1. 5
 - ☒ 2. 2
 - ☒ 3. 3
 - ☒ 4. 4

Question ID : 3084112983

Chosen Option : 4

Q.55 The number of transfer units (NTU) of a heat exchanger is defined in terms of maximum heat capacity of the fluid ($C_{\max}$), minimum heat capacity of the fluid ($C_{\min}$), overall heat transfer coefficient (U_o) and overall heat transfer surface area (A_o) as

- Ans
- ☒ 1. $\frac{U_o A_o}{C_{\max}}$
 - ☒ 2. $\frac{C_{\max}}{U_o A_o}$
 - ☒ 3. $\frac{U_o A_o}{C_{\min}}$
 - ☒ 4. $\frac{C_{\min}}{U_o A_o}$

Question ID : 3084112935

Chosen Option : 1

Q.56 According to Euler's column theory, the crippling load of a column of length (l), with one end fixed and the other end hinged is

- Ans
- ☒ 1. $\frac{2\pi^2 EI}{l^2}$
 - ☒ 2. $\frac{4\pi^2 EI}{l^2}$
 - ☒ 3. $\frac{\pi^2 EI}{4l^2}$
 - ☒ 4. $\frac{\pi^2 EI}{l^2}$

Question ID : 3084112900

Chosen Option : 2

Q.57 The linear velocity of a body rotating at ' ω ' rad/s along a circular path of radius r is

Ans ✓ 1. ωr

✗ 2. $\frac{\omega}{r}$

✗ 3. $\omega^2 r$

✗ 4. $\frac{\omega^2}{r}$

Question ID : 3084112905
Chosen Option : 1

Q.58 In a turbulent flow, the loss of pressure head is approximately (where v is the velocity of flow)

Ans ✗ 1. Inversely proportional to v^2

✓ 2. Directly proportional to v^2

✗ 3. Inversely proportional to v

✗ 4. Directly proportional to v

Question ID : 3084112923
Chosen Option : 1

Q.59 According to Zeroth law of thermodynamics, the measuring instrument evolved based on thermal equilibrium is

Ans ✗ 1. Heat pump

✓ 2. Thermometer

✗ 3. Calorimeter

✗ 4. Thermocouple

Question ID : 3084112942
Chosen Option : 2

Q.60 The type of pattern which is generally used for casting of symmetrical large components is

Ans ✗ 1. Solid piece pattern

✗ 2. Loose piece pattern

✓ 3. Sweep pattern

✗ 4. Match plate pattern

Question ID : 3084112963
Chosen Option : 4

Q.61 Mercury is considered as the best liquid to use for the pressure measuring device manometers because it has

Ans ✗ 1. High vapour pressure and high density

✓ 2. Low vapour pressure and high density

✗ 3. Low surface tension

✗ 4. High density and low viscosity

Question ID : 3084112925
Chosen Option : 3

Q.62 An object starts from rest at $x = 0$ and $t = 0$ s. It moves with a constant acceleration of 2 m/s^2 along the X-axis. What is the average velocity between 1 s and 5 s?

- Ans
- ☒ 1. 2 m/s
 - ☒ 2. 4 m/s
 - ☒ 3. 6 m/s
 - ☒ 4. 8 m/s

Question ID : 3084112896
Chosen Option : 1

Q.63 The highest level of automation and improved speed are found in

- Ans
- ☒ 1. CNC machine tools
 - ☒ 2. Automatic transfer machines
 - ☒ 3. Machine tools with electrohydraulic positioning and control
 - ☒ 4. DNC machining system

Question ID : 3084112977
Chosen Option : 3

Q.64 During polytropic process, the states have been changed from P_1, V_1, T_1 to P_2, V_2, T_2 . Then the change in entropy during the process is given by

- Ans
- ☒ 1. $\frac{(n-\gamma)}{(\gamma-1)R} \ln \left(\frac{T_2}{T_1} \right)$
 - ☒ 2. $\frac{(n-\gamma)}{(\gamma-1)(n-1)R} \ln \left(\frac{P_2}{P_1} \right)$
 - ☒ 3. $\frac{(n-\gamma)}{(n-1)R} \ln \left(\frac{P_2}{P_1} \right)$
 - ☒ 4. $\frac{(n-\gamma)}{(1-\gamma)R} \ln \left(\frac{V_2}{V_1} \right)$

Question ID : 3084112937
Chosen Option : 2

Q.65 Which type of coordinate measuring machine is most suited for large heavy work pieces?

- Ans
- ☒ 1. General bridge type
 - ☒ 2. Horizontal boring mill type
 - ☒ 3. Floating bridge type
 - ☒ 4. Cantilever type

Question ID : 3084112981

Chosen Option : 2

Q.66 The thermal resistance offered by a hollow cylinder is given by the equation

- Ans
- ☒ 1. $\left(\frac{k}{2\pi L}\right) \ln \left[\frac{r_o}{r_i}\right]$
 - ☒ 2. $\left(\frac{L}{2\pi k}\right) \ln \left[\frac{r_o}{r_i}\right]$
 - ☒ 3. $\left(\frac{2\pi k}{L}\right) \ln \left[\frac{r_o}{r_i}\right]$
 - ☒ 4. $\left(\frac{1}{2\pi kL}\right) \ln \left[\frac{r_o}{r_i}\right]$

Question ID : 3084112929

Chosen Option : 1

Q.67 The percentage elongation of length and the percentage reduction in the area of cross-section of the material during tensile test depends on

- Ans
- ☒ 1. Fatigue strength of the material
 - ☒ 2. Toughness of the material
 - ☒ 3. Ductility of the material
 - ☒ 4. Hardness of the material

Question ID : 3084112904

Chosen Option : 3

Q.68 A thermally transparent surface of transmissivity 0.15 receives 500 kcal/min of radiation and reflects back 200 kcal/min out of it, then the emissivity of the surface is

- Ans
- ☒ 1. 0.5
 - ☒ 2. 0.45
 - ☒ 3. 0.4
 - ☒ 4. 0.2

Question ID : 3084112934

Chosen Option : 2

Q.69 Draft allowance is provided on the pattern for the metal casting process in order for

Ans ☒ 1.

Easy removal of pattern without damaging to the mould cavity

☒ 2. Compensating the liquid and solidification shrinkage

☒ 3. Getting good surface finish and accuracy

☒ 4. Compensating the machining process

Question ID : 3084112964

Chosen Option : 3

Q.70 The type of activity that does not require any resources and time is known as

Ans ☒ 1. Dummy activity

☒ 2. No activity

☒ 3. Unique activity

☒ 4. Preceding activity

Question ID : 3084113000

Chosen Option : 4

Q.71 Tungsten carbide tipped drill bits are generally used for

Ans ☒ 1. Slow drilling process

☒ 2. Drilling without coolant

☒ 3. Smooth surface finish

☒ 4. Drilling on glass material

Question ID : 3084112973

Chosen Option : 4

Q.72 The fin efficiency for a fin with finite length having insulated at the tip end is

Ans ☒ 1. 100 %

☒ 2. $\frac{\tan(mL)}{(mL)}$

☒ 3. $\frac{\tanh(mL)}{(mL)}$

☒ 4. $\frac{\tan(mL)}{L}$

Question ID : 3084112931

Chosen Option : 4

Q.73 The enthalpy drop in the fixed and moving blades of a reaction turbine are 25 kJ/kg and 50 kJ/kg respectively. Then the degree of reaction for this stage is given by

Ans

- ✓ 1. $\frac{2}{3}$
- ✗ 2. $\frac{3}{4}$
- ✗ 3. $\frac{1}{2}$
- ✗ 4. $\frac{1}{3}$

Question ID : 3084112953
Chosen Option : 2

Q.74 Two equal forces each of magnitude P are acting at an angle of 90° . The magnitude of resultant force and the angle made with positive X-axis are

Ans

- ✗ 1. $\frac{P}{\sqrt{2}}$ and 0°
- ✗ 2. $\frac{P}{2}$ and 0°
- ✓ 3. $\sqrt{2} P$ and 45°
- ✗ 4. $2 P$ and 45°

Question ID : 3084112891
Chosen Option : 2

Q.75 What is the advantage of a mechanical comparator over other type of comparator?

Ans

- ✗ 1. Range of measurement is large
- ✓ 2. No need of external supply
- ✗ 3. No parallax error
- ✗ 4. Less moving parts

Question ID : 3084112980
Chosen Option : 4

Q.76 A device which is used to maintain the body temperature at higher than the surrounding temperature is called as

Ans

- ✗ 1. Heat engine
- ✓ 2. Heat pump
- ✗ 3. Evaporator
- ✗ 4. Refrigerator

Question ID : 3084112940
Chosen Option : 4

Q.77 In Hungarian method of solving an assignment problem, the row reduction is obtained by

Ans ☒ 1.

Dividing each row by the elements of the row above it

☒ 2.

Subtracting the elements of the row from elements of the row above it

☒ 3.

Subtracting the smallest element from all other elements of the row

☒ 4.

Subtracting all the elements of the row from the highest element in the matrix

Question ID : 3084112997

Chosen Option : 3

Q.78 The follower extensively used for cam mechanism in air-craft engine based on their application is

Ans ☒ 1. Roller follower

☒ 2. Knife edge follower

☒ 3. Flat faced follower

☒ 4. Spherical face follower

Question ID : 3084112907

Chosen Option : 1

Q.79 In the present British system, what is the magnitude of wear allowance in Go gauge?

Ans ☒ 1. One tenth of gauge tolerance

☒ 2. One fourth of gauge tolerance

☒ 3. One third of gauge tolerance

☒ 4. One fifth of gauge tolerance

Question ID : 3084112978

Chosen Option : 3

Q.80 A soap bubble becomes spherical in shape in the atmosphere because

Ans ☒ 1.

A sphere will have minimum volume for a given surface energy

☒ 2. A spherical shape will have maximum energy

☒ 3.

A sphere will have minimum surface area for a given volume

☒ 4.

Internal pressure acting inside the bubble is minimum

Question ID : 3084112924

Chosen Option : 3

Q.81 The stock of materials kept in the stores in anticipation of future demand is known as

- Ans
- ☐ 1. Raw materials
 - ☐ 2. Storage of materials
 - ☐ 3. Finished products
 - ☒ 4. Inventory

Question ID : 3084112992
Chosen Option : 2

Q.82 Which of the cost estimates and performance measures are not used for economic analysis of a queuing system?

- Ans
- ☐ 1. The average number of customers in the system
 - ☒ 2. Average waiting time of customers in the system
 - ☐ 3. Cost per server per unit of time
 - ☐ 4. Cost per unit of time for a customer waiting in the system

Question ID : 3084112998
Chosen Option : 4

Q.83 The fly wheel of steam engine has a radius of gyration of 1 m and mass 2500 kg. The starting torque of the steam engine is 1500 N-m and may be assumed constant. What is the angular acceleration of the fly wheel?

- Ans
- ☒ 1. 0.6 rad/s^2
 - ☐ 2. 2.5 rad/s^2
 - ☐ 3. 1.67 rad/s^2
 - ☐ 4. 0.4 rad/s^2

Question ID : 3084112908
Chosen Option : 3

Q.84 The Shielding gases used in TIG welding are

- Ans
- ☐ 1. Hydrogen and Oxygen
 - ☐ 2. Argon and Helium
 - ☐ 3. Carbondioxide and Hydrogen
 - ☒ 4. Carbondioxide and Oxygen

Question ID : 3084112969
Chosen Option : 3

Q.85 A screw is considered as self-locking if the

- Ans
- ☐ 1. Friction angle is equal to the helix angle
 - ☒ 2. Friction angle is more than the helix angle
 - ☐ 3. Friction angle is less than the helix angle
 - ☐ 4. Efficiency of the screw is 100 %

Question ID : 3084112893
Chosen Option : 3

Q.86 When a shaft is subjected to torsion, the shear stress induced in the shaft varies from

Ans ☒ 1.

Minimum at the centre to maximum at the circumference

☒ 2. Maximum at the centre to zero at the circumference

☒ 3.

Maximum at the centre to minimum at the circumference

☒ 4. Zero at the centre to maximum at the circumference

Question ID : 3084112899
Chosen Option : 2

Q.87 When the total allocation in a transportation model of " $m \times n$ " size is not equal to " $m+n-1$ ", then the situation is said to be

Ans ☒ 1. Degeneracy

☒ 2. Unbalanced situation

☒ 3. Tie situation

☒ 4. Unknown solution situation

Question ID : 3084112996
Chosen Option : 4

Q.88 In which of the following hardness test the steel ball is used as indenter?

Ans ☒ 1. Brinell test

☒ 2. Vickers test

☒ 3. Charpy test

☒ 4. Rockwell test

Question ID : 3084112960
Chosen Option : 4

Q.89 The ceramic tools are generally fixed to the tool by the following process

Ans ☒ 1. Soldering

☒ 2. Clamping

☒ 3. Brazing

☒ 4. Welding

Question ID : 3084112970
Chosen Option : 2

Q.90 The anti-knocking agent generally added to avoid detonation in C.I. Engine is

Ans ☒ 1. Hexadecane

☒ 2. Naphthane

☒ 3. Amyl Nitrate

☒ 4. Tetra Ethyl Lead

Question ID : 3084112949
Chosen Option : 3

Q.91 The sequence of operations involved in producing the parts by powder metallurgy technique are

- Ans
- ✓ 1. Blending, Compacting, Sintering and Forging
 - ✗ 2. Compacting, Blending, Sintering and Forging
 - ✗ 3. Sintering, Blending, Compacting and Forging
 - ✗ 4. Blending, Sintering, Compacting and Forging

Question ID : 3084112968
Chosen Option : 3

Q.92 The type of jig used to drill the series of equidistant holes along the circle on a work piece is

- Ans
- ✗ 1. Plate type jig
 - ✓ 2. Index type jig
 - ✗ 3. Pot type jig
 - ✗ 4. Open type jig

Question ID : 3084112976
Chosen Option : 3

Q.93 Gantt charts are generally used in manufacturing industries to illustrate

- Ans
- ✓ 1. Project schedule
 - ✗ 2. Assignable causes of variation in a process
 - ✗ 3. Material requirement
 - ✗ 4. Inventory status

Question ID : 3084112987
Chosen Option : 2

Q.94 On stress strain diagram for the ductile material, at a certain point where the material exhibits maximum stress before necking occurs is known as

- Ans
- ✓ 1. Ultimate tensile strength
 - ✗ 2. Elastic limit
 - ✗ 3. Proportional limit
 - ✗ 4. Yield point

Question ID : 3084112957
Chosen Option : 4

Q.95 In deep drawing process for the sheets, the limiting draw ratio majorly depends on

- Ans
- ✗ 1. Yield strength of sheet metal
 - ✓ 2. Thickness of sheet metal
 - ✗ 3. Elastic limit of sheet metal
 - ✗ 4. Type of press used

Question ID : 3084112967
Chosen Option : 4

Q.96 If the rotating mass of rim type flywheel is distributed on another rim type flywheel whose radius is half of the mean radius of the former, then the energy stored in the later at the same speed will be

- Ans
- ☒ 1. One and half times the first one
 - ☒ 2. Four times the first one
 - ☒ 3. One fourth of the first one
 - ☒ 4. Same as the first one

Question ID : 3084112910
Chosen Option : 3

Q.97 If the relation between number of links (n) and number of lower pairs (p) is given as $n < 2p - 4$, then the kinematic chain is said to be

- Ans
- ☒ 1. Structure
 - ☒ 2. Unconstrained
 - ☒ 3. Constrained
 - ☒ 4. Locked

Question ID : 3084112906
Chosen Option : 3

Q.98 In the graphical method of solving the linear programming problem, while converting the inequalities, it is required to assume

- Ans
- ☒ 1. Them to be equations
 - ☒ 2. Slack variables
 - ☒ 3. Artificial surplus variables
 - ☒ 4. As constraints

Question ID : 3084112995
Chosen Option : 1

Q.99 What is the type of bearing in which the bearing pressure is acting perpendicular to the axis of the shaft?

- Ans
- ☒ 1. Foot step bearing
 - ☒ 2. Journal bearing
 - ☒ 3. Thrust bearing
 - ☒ 4. Ball bearing

Question ID : 3084112919
Chosen Option : 4

Q.10 The equation for volumetric efficiency of a reciprocating compressor with a clearance ratio 'k' for specified pressure ratio (p_2/p_1) and polytropic index 'n' is

Ans

✗ 1. $1 - k - k \left(\frac{p_2}{p_1} \right)^{(1/n)}$

✗ 2. $1 - k + k \left(\frac{p_2}{p_1} \right)^{(1/n)}$

✗ 3. $1 + k + k \left(\frac{p_2}{p_1} \right)^{(1/n)}$

✓ 4. $1 + k - k \left(\frac{p_2}{p_1} \right)^{(1/n)}$

Question ID : 3084112944

Chosen Option : 3

Q.10 If 'F' is the fixed cost, 'V' is the variable cost per unit and 'P' is the selling price of each unit, then break-even point is equal to

Ans

✗ 1. $F \times \frac{V}{P}$

✓ 2. $\frac{F}{1 - \frac{V}{P}}$

✗ 3. $F \times \frac{P}{V}$

✗ 4. $\frac{F}{1 + \frac{V}{P}}$

Question ID : 3084112986

Chosen Option : 2

Q.10 By incorporating the regenerator in the Braton cycle gas turbine plant

Ans

✗ 1. Network output increases

✓ 2. Efficiency increases

✗ 3. Efficiency decreases

✗ 4. Network output decreases

Question ID : 3084112947

Chosen Option : 2

Q.10 Which of the following is a necessary condition for capillary action to take place, if the small tube is kept in a liquid?

Ans ☒ 1.

Adhesive forces must be greater than cohesive forces

☒ 2. Fluid pressure must be negligible

☒ 3. The viscous forces are to be dominant

☒ 4. There is a gravitational force on the fluid

Question ID : 3084112922
Chosen Option : 2

Q.10 In summer air-conditioning system, fresh air is introduced into the re-circulated air to

Ans ☒ 1. Reduce the quantity of supply air

☒ 2. Exercise easy control over the equipment

☒ 3.

Improve air quality by diluting the odour and contaminants

☒ 4. Reduce load on the equipment

Question ID : 3084112951
Chosen Option : 3

Q.10 If the air is compressed isothermally from the pressure 'P₁' to 'P₂', then the work supplied is given by

Ans

☒ 1. $mRT_1 \ln \left(\frac{P_2}{P_1} \right)$

☒ 2. $\left(\frac{n}{n-1} \right) mRT_1 \ln \left(\frac{P_2}{P_1} \right)$

☒ 3. $\left(\frac{n}{n-1} \right) mRT_1 \left[\left(\frac{P_2}{P_1} \right)^{\frac{n-1}{n}} - 1 \right]$

☒ 4. $\left(\frac{\gamma}{\gamma-1} \right) mRT_1 \left[\left(\frac{P_2}{P_1} \right)^{\frac{\gamma-1}{\gamma}} - 1 \right]$

Question ID : 3084112936
Chosen Option : 3

Q.10 Which of the following welded joints is designed for the shear strength?

Ans ☒ 1. Butt welded joint

☒ 2. Transverse fillet welded joint

☒ 3. Parallel fillet welded joint

☒ 4. Transverse butt weld joint

Question ID : 3084112917
Chosen Option : 3

Q.10 A simply supported beam of length ' l ' with a gradually varying load from zero at one end
7 'B' and w per unit length at the other end 'A', then the shear force at 'B' is given by

- Ans
- ☒ 1. wl
 - ☒ 2. $\frac{wl}{3}$
 - ☒ 3. $\frac{2wl}{3}$
 - ☒ 4. $\frac{wl}{6}$

Question ID : 3084112903
Chosen Option : 2

Q.10 The outside diameter of solid and hollow shafts is ' D ' and the inside diameter of hollow
8 shaft is $\frac{D}{2}$. The ratio of strengths of solid shaft to hollow shafts in torsion is

- Ans
- ☒ 1. $\frac{1}{2}$
 - ☒ 2. $\frac{1}{8}$
 - ☒ 3. $\frac{15}{16}$
 - ☒ 4. $\frac{1}{16}$

Question ID : 3084112915
Chosen Option : 2

Q.10 The plant layout in which machines and equipment are arranged according to their function is
9

- Ans
- ☒ 1. Product layout
 - ☒ 2. Process layout
 - ☒ 3. Fixed position layout
 - ☒ 4. Cellular layout

Question ID : 3084112990
Chosen Option : 2

Q.11 In a rotational flow of incompressible fluid, which one of the following acceleration
0 component is zero?

- Ans
- ☒ 1. Radial acceleration
 - ☒ 2. Centrifugal acceleration
 - ☒ 3. Convective acceleration
 - ☒ 4. Tangential acceleration

Question ID : 3084112927
Chosen Option : 1

Q.11 ₁ The optimum pressure ratio of axial flow compressor is generally obtained at

- Ans
- ✓ 1. High speed and high flow
 - ✗ 2. High speed and low flow
 - ✗ 3. Low speed and high flow
 - ✗ 4. Low speed and low flow

Question ID : 3084112945

Chosen Option : 1

Q.11 ₂ The maximum time that would be required to accomplish an activity according to the time estimates generated by PERT is referred as

- Ans
- ✗ 1. Most likely time
 - ✗ 2. Expected time
 - ✓ 3. Pessimistic time
 - ✗ 4. Optimistic time

Question ID : 3084112999

Chosen Option : 3

Q.11 ₃ The energy source available at a temperature of 500 K provides 1000 kJ of heat, when the ambient temperature is 27°C. The available energy that can be extractable from the given heat source and unavailable energy are

- Ans
- ✗ 1. 600 kJ and 400 kJ
 - ✗ 2. 700 kJ and 300 kJ
 - ✓ 3. 400 kJ and 600 kJ
 - ✗ 4. 300 kJ and 700 kJ

Question ID : 3084112941

Chosen Option : 2

Q.11 ₄ What is the purpose of gating system in metal casting process?

- Ans
- ✗ 1. To cool the casting product rapidly and effectively
 - ✓ 2. To regulate and control the flow of molten metal in to the mould cavity
 - ✗ 3. To control the temperature of molten metal in the mould cavity
 - ✗ 4. To remove the impurities existing in the molten metal in the cavity

Question ID : 3084112962

Chosen Option : 3

Q.11 What is the increase in tool life when the cutting speed is reduced by 50%? Use the
 5 Taylor equation for tool life with $n = 0.5$ and $C = 120$.

- Ans
- ☒ 1. Same as the initial tool life
 - ☒ 2. Two times of initial tool life
 - ☒ 3. Three times of initial tool life
 - ☒ 4. Four times of initial tool life

Question ID : 3084112974

Chosen Option : 4

Q.11 The steam rate required for the Rankine cycle to generate turbine work ' W_T ' and the
 6 required pump work ' W_P ' is

- Ans
- ☒ 1. $\frac{1800}{(W_T - W_P)}$
 - ☒ 2. $\frac{3600}{(W_T - W_P)}$
 - ☒ 3. $\frac{900}{(W_T - W_P)}$
 - ☒ 4. $\frac{2700}{(W_T - W_P)}$

Question ID : 3084112946

Chosen Option : 2

Q.11 In a thin spherical shell of diameter ' d ', the total force normal to a diametrical plane
 7 due to an internal fluid pressure ' p ' is given by

- Ans
- ☒ 1. $\frac{pd}{t}$
 - ☒ 2. $\frac{\pi pd^2}{4t}$
 - ☒ 3. $\frac{pd}{2t}$
 - ☒ 4. $\frac{pd}{4t}$

Question ID : 3084112901

Chosen Option : 3

Q.11
8 A better machinable metal is one for which the condition required is

Ans ☒ 1.

Lower chip tool contact area and smaller shear angle.

☒ 2.

Higher chip tool contact area and smaller shear angle.

☒ 3. Higher chip tool contact area and larger shear angle.

☒ 4. Lower chip tool contact area and larger shear angle.

Question ID : 3084112972
Chosen Option : 3

Q.11
9 The free vibrations of a single degree of freedom system is described in general by a

Ans ☒ 1.

Homogenous first order ordinary differential equation

☒ 2.

Homogenous second order ordinary differential equation

☒ 3. Cartesian equation with first order differential form

☒ 4. Cartesian equation with zero order differential form

Question ID : 3084112914
Chosen Option : 2

Q.12
0 The material used for imparting the strength and collapsibility in core sand during core making process is

Ans ☒ 1. Molasses

☒ 2. Sulphite binder

☒ 3. Thermo-setting resin

☒ 4. Core oil

Question ID : 3084112965
Chosen Option : 3