BEL PE

Previous Year Paper

(Mechanical)

17 Dec, 2023 Shift 2

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Test Date	17/12/2023
Test Time	12:30 PM - 2:30 PM
Subject	Probationary Engineer Mechanical

Section : **General Aptitude**

Q.1 **Which of the following factors is most likely to influence the type of vegetation and fauna found in a particular region?**

Ans
✗ 1. Economic development
✓ 2. Altitude
✗ 3. Population density
✗ 4. Political stability

Question ID : **630680508939**
Option 1 ID : **6306801989054**
Option 2 ID : **6306801989052**
Option 3 ID : **6306801989053**
Option 4 ID : **6306801989055**
Status : **Answered**
Chosen Option : **2**

Q.2 **Which of the following is a key characteristic of microeconomics?**

Ans
✗ 1. Analysis of government fiscal policies
✗ 2. Examination of aggregate economic indicators
✓ 3. Focus on individual economic units
✗ 4. Study of the overall economy

Question ID : **630680508933**
Option 1 ID : **6306801989030**
Option 2 ID : **6306801989031**
Option 3 ID : **6306801989029**
Option 4 ID : **6306801989028**
Status : **Answered**
Chosen Option : **3**

Q.3 **Which of the following is a macronutrient that serves as the body's primary source of energy?**

Ans
- ✔ 1. Carbohydrates
- ✘ 2. Minerals
- ✘ 3. Vitamins
- ✘ 4. Proteins

Question ID : **630680508944**
Option 1 ID : **6306801989075**
Option 2 ID : **6306801989073**
Option 3 ID : **6306801989072**
Option 4 ID : **6306801989074**
Status : **Answered**
Chosen Option : **1**

Q.4 **Which of the following is the process by which organisms break down food to release energy?**

Ans
- ✘ 1. Nitrogen fixation
- ✘ 2. Photosynthesis
- ✔ 3. Cellular respiration
- ✘ 4. Fermentation

Question ID : **630680508943**
Option 1 ID : **6306801989071**
Option 2 ID : **6306801989069**
Option 3 ID : **6306801989070**
Option 4 ID : **6306801989068**
Status : **Answered**
Chosen Option : **3**

Q.5 **Which key personality known as "Iron Man of India" played a significant role in the integration of princely states into the Indian Union after independence?**

Ans
- ✘ 1. Mahatma Gandhi
- ✘ 2. Subhas Chandra Bose
- ✔ 3. Sardar Vallabhbhai Patel
- ✘ 4. Jawaharlal Nehru

Question ID : **630680508935**
Option 1 ID : **6306801989036**
Option 2 ID : **6306801989037**
Option 3 ID : **6306801989038**
Option 4 ID : **6306801989039**
Status : **Answered**
Chosen Option : **3**

Q.6 What was the capital city of the Mauryan Empire during its peak under Ashoka's rule?

Ans
✗ 1. Kalsi
✗ 2. Viratnagar
✗ 3. Sanchi
✓ 4. Pataliputra

Question ID : **630680508936**
Option 1 ID : **6306801989043**
Option 2 ID : **6306801989041**
Option 3 ID : **6306801989042**
Option 4 ID : **6306801989040**
Status : **Answered**
Chosen Option : **3**

Q.7 What was the primary purpose of the Mauryan emperor Ashoka's Rock Edicts?

Ans
✗ 1. To showcase architectural achievements
✗ 2. To establish trade routes
✓ 3. To propagate Buddhist principles and moral values
✗ 4. To record military victories

Question ID : **630680508937**
Option 1 ID : **6306801989047**
Option 2 ID : **6306801989046**
Option 3 ID : **6306801989045**
Option 4 ID : **6306801989044**
Status : **Answered**
Chosen Option : **3**

Q.8 Which Indian sports personality was awarded the Major Dhyan Chand Khel Ratna Award, the highest sporting honour in India, in the year 2021?

Ans
✗ 1. P. V. Sindhu
✗ 2. Rohit Sharma
✓ 3. Neeraj Chopra
✗ 4. Virat Kohli

Question ID : **630680508938**
Option 1 ID : **6306801989049**
Option 2 ID : **6306801989051**
Option 3 ID : **6306801989050**
Option 4 ID : **6306801989048**
Status : **Answered**
Chosen Option : **4**

Q.9 Which of the following is a Fundamental Right guaranteed by the Indian Constitution?

Ans
✗ 1. Right to Strike
✓ 2. Right to Education
✗ 3. Right to Property
✗ 4. Right to Taxation

Question ID : **630680508941**
Option 1 ID : **6306801989062**
Option 2 ID : **6306801989060**
Option 3 ID : **6306801989061**
Option 4 ID : **6306801989063**
Status : **Answered**
Chosen Option : **2**

Q.10 Which of the following world organization is responsible for publishing the Human Capital Index (HCI)?

Ans
✗ 1. International Monetary Fund (IMF)
✓ 2. World Bank
✗ 3. World Economic Forum
✗ 4. United Nations

Question ID : **630680508934**
Option 1 ID : **6306801989032**
Option 2 ID : **6306801989035**
Option 3 ID : **6306801989034**
Option 4 ID : **6306801989033**
Status : **Not Answered**
Chosen Option : **--**

Q.11 Which of the following is the head of the executive council of the Indian government?

Ans
✗ 1. The Vice President
✗ 2. The Speaker of the Lok Sabha
✓ 3. The Prime Minister
✗ 4. The President

Question ID : **630680508942**
Option 1 ID : **6306801989066**
Option 2 ID : **6306801989067**
Option 3 ID : **6306801989065**
Option 4 ID : **6306801989064**
Status : **Answered**
Chosen Option : **4**

Q.12 **Which of the following sectors is primarily responsible for the generation and distribution of electrical power?**

Ans
✗ 1. Trade and Industry
✗ 2. Infrastructure
✗ 3. Agriculture
✓ 4. Power and Energy

Question ID : **630680508940**
Option 1 ID : **6306801989059**
Option 2 ID : **6306801989057**
Option 3 ID : **6306801989056**
Option 4 ID : **6306801989058**
Status : **Answered**
Chosen Option : **4**

Section : **Reasoning**

Q.1 **Neelam says, "Shreya's mother is the wife of my father." How is Neelam's father related to Shreya?**

Ans
✓ 1. Father
✗ 2. Brother
✗ 3. Son
✗ 4. Husband

Question ID : **630680508950**
Option 1 ID : **6306801989098**
Option 2 ID : **6306801989097**
Option 3 ID : **6306801989099**
Option 4 ID : **6306801989096**
Status : **Answered**
Chosen Option : **1**

Q.2 **Four letter-clusters have been given, out of which three are alike in some manner and one is different. Select the odd letter-cluster.**

Ans
✗ 1. PM
✓ 2. RU
✗ 3. LI
✗ 4. ZW

Question ID : **630680508952**
Option 1 ID : **6306801989104**
Option 2 ID : **6306801989105**
Option 3 ID : **6306801989106**
Option 4 ID : **6306801989107**
Status : **Answered**
Chosen Option : **1**

Q.3 If B denotes 'subtraction', C denotes 'addition', and D denotes 'division', then what will be the value of the following equation?
10 D 2 B 5 C 3 = ?

Ans
1. 1
2. 4
3. 2
4. 3

Question ID : **630680508955**
Option 1 ID : **6306801989119**
Option 2 ID : **6306801989116**
Option 3 ID : **6306801989118**
Option 4 ID : **6306801989117**
Status : **Answered**
Chosen Option : **4**

Q.4 Which of the following numbers will replace the question mark (?) in the given series?
32, 48, 64, 80, ?, 112

Ans
1. 92
2. 96
3. 94
4. 95

Question ID : **630680508953**
Option 1 ID : **6306801989108**
Option 2 ID : **6306801989109**
Option 3 ID : **6306801989110**
Option 4 ID : **6306801989111**
Status : **Answered**
Chosen Option : **2**

Q.5 Which two numbers should be interchanged to make the given equation correct?
20 ÷ 2 × 4 + 7 - 3 = 8

Ans
1. 4 and 3
2. 8 and 20
3. 7 and 4
4. 4 and 2

Question ID : **630680508956**
Option 1 ID : **6306801989121**
Option 2 ID : **6306801989122**
Option 3 ID : **6306801989123**
Option 4 ID : **6306801989120**
Status : **Answered**
Chosen Option : **2**

Q.6 Which of the following numbers will replace the question mark (?) in the given series?
144, 120, 96, 72, ?, 24

Ans
✗ 1. 44
✓ 2. 48
✗ 3. 51
✗ 4. 47

Question ID : **630680508954**
Option 1 ID : **6306801989115**
Option 2 ID : **6306801989114**
Option 3 ID : **6306801989112**
Option 4 ID : **6306801989113**
Status : **Answered**
Chosen Option : **2**

Q.7 Six friends M, N, O, P, Q, and R are sitting around a circular table facing the centre. R is sitting between O and N. M is sitting to the immediate left of Q. P sits third to the left of N. N does not sit adjacent to Q. Who is sitting to the immediate left of P?

Ans
✗ 1. M
✓ 2. Q
✗ 3. R
✗ 4. O

Question ID : **630680508945**
Option 1 ID : **6306801989077**
Option 2 ID : **6306801989076**
Option 3 ID : **6306801989078**
Option 4 ID : **6306801989079**
Status : **Answered**
Chosen Option : **2**

Q.8 Select the option that is related to the third word in the same way as the second word is related to the first word.
Oceanography : Oceans :: Herpetology : ?

Ans
✓ 1. Snakes
✗ 2. Dogs
✗ 3. Cakes
✗ 4. Stones

Question ID : **630680508951**
Option 1 ID : **6306801989101**
Option 2 ID : **6306801989100**
Option 3 ID : **6306801989103**
Option 4 ID : **6306801989102**
Status : **Answered**
Chosen Option : **1**

Q.9 Which of the following letter clusters will replace the question mark (?) in the given series?
GKE, HLF, ? , JNH, KOI

Ans
✗ 1. IMH
✗ 2. ING
✓ 3. IMG
✗ 4. HMG

Question ID : **630680508948**
Option 1 ID : **6306801989091**
Option 2 ID : **6306801989089**
Option 3 ID : **6306801989088**
Option 4 ID : **6306801989090**
Status : **Answered**
Chosen Option : **3**

Q.10 In a storage room, there are 60 boxes stacked one on top of the other. If a box is at the 8th position from the bottom, what will be its position from the top?

Ans
✗ 1. 54
✗ 2. 51
✗ 3. 52
✓ 4. 53

Question ID : **630680508946**
Option 1 ID : **6306801989083**
Option 2 ID : **6306801989081**
Option 3 ID : **6306801989080**
Option 4 ID : **6306801989082**
Status : **Answered**
Chosen Option : **4**

Q.11 In a certain code language, if ELEPHANT is coded as 5M5QI1OU, TIGER is coded as U9H5S, then what will LION be coded as?

Ans
✗ 1. M915P
✓ 2. M915O
✗ 3. M9PO
✗ 4. M915Q

Question ID : **630680508949**
Option 1 ID : **6306801989093**
Option 2 ID : **6306801989095**
Option 3 ID : **6306801989092**
Option 4 ID : **6306801989094**
Status : **Answered**
Chosen Option : **2**

Q.12 Select the option that is related to the third number in the same way as the second number is related to the first number.
41 : 1640 :: 37 : ?

Ans
✗ 1. 1323
✓ 2. 1332
✗ 3. 1233
✗ 4. 1232

Question ID : **630680508957**
Option 1 ID : **6306801989124**
Option 2 ID : **6306801989125**
Option 3 ID : **6306801989126**
Option 4 ID : **6306801989127**
Status : **Answered**
Chosen Option : **2**

Q.13 Three Statements are given followed by two conclusions numbered I and II. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statement I: All buses are cars.
Statement II: All cars are vehicles.
Statement III: Some vehicles are not bicycles.

Conclusion I: Some vehicles are not cars.
Conclusion II: Some vehicles are bicycles.

Ans
✗ 1. Both conclusions I and II follow
✓ 2. Neither conclusion I nor II follows
✗ 3. Only conclusion II follows
✗ 4. Only conclusion I follows

Question ID : **630680508947**
Option 1 ID : **6306801989086**
Option 2 ID : **6306801989087**
Option 3 ID : **6306801989085**
Option 4 ID : **6306801989084**
Status : **Answered**
Chosen Option : **2**

Section : **Question based on Mechanical Engineering**

Q.1 Which of the following sintering mechanisms primarily involves the migration of vacancies from the neck region to the particle surfaces?

Ans
✗ 1. Evaporation-condensation mechanism
✗ 2. Viscous flow sintering
✓ 3. Diffusion sintering
✗ 4. Surface tension-driven rearrangement

Question ID : **630680509042**
Option 1 ID : **6306801989466**
Option 2 ID : **6306801989464**
Option 3 ID : **6306801989465**
Option 4 ID : **6306801989467**
Status : **Answered**
Chosen Option : **3**

Q.2 **In the context of the virtual work principle in continuum mechanics, which of the following statements is true about a system in equilibrium?**

Ans
✗ 1. Neither conservative nor non-conservative forces do virtual work.
✗ 2. Only non-conservative forces do virtual work.
✓ 3. Both conservative and non-conservative forces can do virtual work.
✗ 4. Only conservative forces do virtual work.

Question ID : **630680508961**
Option 1 ID : **6306801989140**
Option 2 ID : **6306801989142**
Option 3 ID : **6306801989141**
Option 4 ID : **6306801989143**
Status : **Answered**
Chosen Option : **4**

Q.3 **Which type of gear is used to transmit motion between non-coplanar, non-intersecting, and non-parallel shafts?**

Ans
✓ 1. Skew gear
✗ 2. Rack and pinion gear
✗ 3. Crown gear
✗ 4. Herringbone gear

Question ID : **630680508982**
Option 1 ID : **6306801989227**
Option 2 ID : **6306801989225**
Option 3 ID : **6306801989224**
Option 4 ID : **6306801989226**
Status : **Answered**
Chosen Option : **2**

Q.4 **Surge in centrifugal compressors is a phenomenon that can occur when:**

Ans
✗ 1. The flow rate of the gas is increased beyond the maximum design flow rate
✗ 2. The pressure of the incoming gas is decreased beyond a set value
✗ 3. The temperature of the incoming gas is increased beyond a threshold
✓ 4. The flow rate of the gas is reduced below a critical value

Question ID : **630680509026**
Option 1 ID : **6306801989403**
Option 2 ID : **6306801989400**
Option 3 ID : **6306801989402**
Option 4 ID : **6306801989401**
Status : **Answered**
Chosen Option : **1**

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Q.5 **Identify one of the reciprocating sliding contact bearing motion elements?**

Ans

✔ 1. Valve stem

✘ 2. Rocker arm

✘ 3. Piston pins

✘ 4. Crankpins

Question ID : **630680508999**
Option 1 ID : **6306801989292**
Option 2 ID : **6306801989294**
Option 3 ID : **6306801989295**
Option 4 ID : **6306801989293**
Status : **Answered**
Chosen Option : **1**

Q.6 Consider a system subjected to an external force F and an inertia (pseudo) force F_i. The essence of D'Alembert's principle is best captured by which of the following statements?

Ans

✘ 1. The system is in equilibrium when $F = F_i$

✔ 2. The system is in dynamic equilibrium when $F + F_i = 0$

✘ 3. The difference of the internal force and the inertia force on a system is always zero.

✘ 4. The inertia force acts to oppose the action of the external force.

Question ID : **630680508963**
Option 1 ID : **6306801989148**
Option 2 ID : **6306801989151**
Option 3 ID : **6306801989149**
Option 4 ID : **6306801989150**
Status : **Answered**
Chosen Option : **2**

Q.7 In a four-bar linkage, the Grashof's criterion states that for at least one link to be capable of making a complete revolution with respect to its adjacent link, which condition must be met? (s -length of the shortest bar, l- length of the longest bar and p , q – lengths of intermediate bar)

Ans

✔ 1. $s + 1 \leq p + q$

✘ 2. $s \times 1 \leq p \times q$

✘ 3. $s \times 1 \geq p \times q$

✘ 4. $s + 1 \geq p + q$

Question ID : **630680508976**
Option 1 ID : **6306801989202**
Option 2 ID : **6306801989200**
Option 3 ID : **6306801989203**
Option 4 ID : **6306801989201**
Status : **Answered**
Chosen Option : **1**

Q.8 How does increasing the thermal conductivity of a fin material affect its overall heat transfer performance?

Ans
✔ 1. Increases heat transfer rate
✘ 2. Decreases heat transfer rate
✘ 3. No effect on heat transfer rate
✘ 4. Causes instability in heat transfer

Question ID : **630680509010**
Option 1 ID : **6306801989338**
Option 2 ID : **6306801989337**
Option 3 ID : **6306801989339**
Option 4 ID : **6306801989336**
Status : **Answered**
Chosen Option : **1**

Q.9 In a multi-plate friction clutch with multiple discs, if the axial force remains the same but the number of pairs of contact surfaces increases, the torque capacity will:

Ans
✔ 1. Increase
✘ 2. remain unchanged
✘ 3. become unpredictable
✘ 4. decrease

Question ID : **630680508997**
Option 1 ID : **6306801989285**
Option 2 ID : **6306801989287**
Option 3 ID : **6306801989286**
Option 4 ID : **6306801989284**
Status : **Answered**
Chosen Option : **1**

Q.10 For real gases, the Van der Waals equation of state introduces correction factors for both the volume and pressure of the gas. The correction for volume is due to:

Ans
✘ 1. elastic collisions of gas molecules.
✔ 2. finite volume of gas molecules.
✘ 3. gravitational pull-on gas molecules.
✘ 4. electrostatic forces between gas molecules.

Question ID : **630680509017**
Option 1 ID : **6306801989366**
Option 2 ID : **6306801989367**
Option 3 ID : **6306801989365**
Option 4 ID : **6306801989364**
Status : **Answered**
Chosen Option : **2**

Q.11 The instantaneous center of zero velocity for a moving rigid body in planar motion:

Ans
✔ 1. is a point about which the body seems to rotate at that instant.
✘ 2. always lies outside the body.
✘ 3. represents the average velocity of all points on the body.
✘ 4. always lies on the body.

Question ID : **630680508977**
Option 1 ID : **6306801989205**
Option 2 ID : **6306801989206**
Option 3 ID : **6306801989204**
Option 4 ID : **6306801989207**
Status : **Answered**
Chosen Option : **1**

Q.12 In the design of riveted joints, what does the term "efficiency of the joint" typically refer to?

Ans
✔ 1. Ratio of the strength of the riveted joint to the strength of an unriveted plate
✘ 2. Ratio of the total strength of all rivets to the strength of the plate
✘ 3. Ratio of the maximum load-bearing capacity to the weight of the rivet
✘ 4. Ratio of the tensile strength to the shear strength of the rivet material

Question ID : **630680508992**
Option 1 ID : **6306801989266**
Option 2 ID : **6306801989267**
Option 3 ID : **6306801989264**
Option 4 ID : **6306801989265**
Status : **Answered**
Chosen Option : **1**

Q.13 If you've sectioned a truss and have three unknown member forces, which of the following sets of equations would you most likely NOT use to find all of them?

Ans
✔ 1. $\sum F_x = 0, \sum F_y = 0$ and $\sum F_z = 0$
✘ 2. $\sum F_x = 0, \sum F_y = 0$ and $\sum M_C = 0$
✘ 3. $\sum F_x = 0, \sum F_y = 0$ and $\sum M_A = 0$
✘ 4. $\sum F_x = 0, \sum F_y = 0$ and $\sum M_B = 0$

Question ID : **630680508960**
Option 1 ID : **6306801989136**
Option 2 ID : **6306801989139**
Option 3 ID : **6306801989137**
Option 4 ID : **6306801989138**
Status : **Answered**
Chosen Option : **1**

Q.14 A column with both ends pinned (hinged) has an effective length factor (K) of:

Ans
✗ 1. 2L
✗ 2. 0.7L
✗ 3. 0.5L
✓ 4. L

Question ID : **630680508972**
Option 1 ID : **6306801989187**
Option 2 ID : **6306801989185**
Option 3 ID : **6306801989184**
Option 4 ID : **6306801989186**
Status : **Answered**
Chosen Option : **4**

Q.15 For a given column material and cross-sectional shape, if the length of the column is doubled, the crippling load

Ans
✓ 1. is reduced to one-fourth.
✗ 2. is halved.
✗ 3. is doubled.
✗ 4. remains the same.

Question ID : **630680508973**
Option 1 ID : **6306801989189**
Option 2 ID : **6306801989188**
Option 3 ID : **6306801989190**
Option 4 ID : **6306801989191**
Status : **Answered**
Chosen Option : **1**

Q.16 When designing a shaft for fluctuating loads, the primary consideration to prevent fatigue failure is:

Ans
✗ 1. Ultimate tensile strength
✓ 2. Endurance limit
✗ 3. Rigidity
✗ 4. Yield point

Question ID : **630680508993**
Option 1 ID : **6306801989271**
Option 2 ID : **6306801989269**
Option 3 ID : **6306801989270**
Option 4 ID : **6306801989268**
Status : **Answered**
Chosen Option : **2**

Q.17 In which of the following brake systems is the braking action achieved by storing the kinetic energy of the vehicle that can later be reused?

Ans
✔ 1. Regenerative brake
✘ 2. Band brake
✘ 3. Drum brake
✘ 4. Disc brake

Question ID : **630680509001**
Option 1 ID : **6306801989303**
Option 2 ID : **6306801989300**
Option 3 ID : **6306801989301**
Option 4 ID : **6306801989302**
Status : **Answered**
Chosen Option : **1**

Q.18 For dynamic loads, which of the following welded joint types is preferable due to its superior fatigue resistance?

Ans
✘ 1. Spot weld
✘ 2. Fillet weld
✔ 3. Butt weld
✘ 4. Seam weld

Question ID : **630680508991**
Option 1 ID : **6306801989261**
Option 2 ID : **6306801989263**
Option 3 ID : **6306801989260**
Option 4 ID : **6306801989262**
Status : **Answered**
Chosen Option : **4**

Q.19 In the Diesel cycle, if both the compression ratio (r) and the cut-off ratio (r_c) are increased while keeping all other parameters constant, what happens to the cycle's thermal efficiency?

Ans
✘ 1. Increases
✔ 2. Decreases
✘ 3. Remains the same
✘ 4. Cannot be determined with the given information

Question ID : **630680509028**
Option 1 ID : **6306801989409**
Option 2 ID : **6306801989410**
Option 3 ID : **6306801989408**
Option 4 ID : **6306801989411**
Status : **Answered**
Chosen Option : **4**

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Q.20 **The Isochronous governor has a characteristics curve which:**

Ans

✗ 1. is a horizontal Zig-zagline

✗ 2. has a continuous slope

✓ 3. passes through the origin

✗ 4. is a vertical straight line

Question ID : **630680508984**
Option 1 ID : **6306801989234**
Option 2 ID : **6306801989233**
Option 3 ID : **6306801989232**
Option 4 ID : **6306801989235**
Status : **Answered**
Chosen Option : **3**

Q.21 **A system undergoes a cyclic process and returns to its initial state. Which of the following statements is true regarding this process?**

Ans

✗ 1. The system does not exchange heat with the surroundings.

✓ 2. The change in internal energy of the system is zero.

✗ 3. The system has reached absolute zero temperature.

✗ 4. The work done by the system is zero.

Question ID : **630680509016**
Option 1 ID : **6306801989361**
Option 2 ID : **6306801989362**
Option 3 ID : **6306801989363**
Option 4 ID : **6306801989360**
Status : **Answered**
Chosen Option : **2**

Q.22 A material has a modulus of elasticity (Young's modulus) of 'E' and a bulk modulus 'K'. Which of the following relationships between 'E' and 'K' is true for an isotropic material with Poisson's ratio 'v'?

Ans

✓ 1. $E = 3K(1 - 2v)$

✗ 2. $E = 3K(1 + v)$

✗ 3. $E = K(1 - v)$

✗ 4. $E = 2K(1 + v)$

Question ID : **630680508965**
Option 1 ID : **6306801989157**
Option 2 ID : **6306801989159**
Option 3 ID : **6306801989158**
Option 4 ID : **6306801989156**
Status : **Answered**
Chosen Option : **1**

Q.23 Which of the following is an output of a typical MRP system?

Ans
✗ 1. Service parts requirements
✗ 2. Bill of material
✗ 3. Inventory status file
✓ 4. Planned order schedule

Question ID : **630680509049**
Option 1 ID : **6306801989494**
Option 2 ID : **6306801989492**
Option 3 ID : **6306801989495**
Option 4 ID : **6306801989493**
Status : **Answered**
Chosen Option : **1**

Q.24 Which phase in steel is magnetic and has a body-centred cubic (BCC) crystal structure?

Ans
✗ 1. Cementite
✗ 2. Austenite
✗ 3. Pearlite
✓ 4. Ferrite

Question ID : **630680509037**
Option 1 ID : **6306801989444**
Option 2 ID : **6306801989445**
Option 3 ID : **6306801989446**
Option 4 ID : **6306801989447**
Status : **Answered**
Chosen Option : **4**

Q.25 If the lower deviation of a hole is zero and the minimum limit of hole size is the basic size, what type of shaft is it?

Ans
✗ 1. Shaft Basis System
✗ 2. Basic Hole
✓ 3. Hole Basis System
✗ 4. Basic Shaft

Question ID : **630680509046**
Option 1 ID : **6306801989480**
Option 2 ID : **6306801989482**
Option 3 ID : **6306801989481**
Option 4 ID : **6306801989483**
Status : **Answered**
Chosen Option : **3**

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Q.26 **When analyzing the acceleration of a point in a rotating link using the relative acceleration equation, which component is NOT directly considered?**

Ans

✗ 1. Coriolis acceleration

✗ 2. Tangential acceleration

✗ 3. Centripetal acceleration

✓ 4. Gravitational acceleration

Question ID : **630680508978**
Option 1 ID : **6306801989208**
Option 2 ID : **6306801989210**
Option 3 ID : **6306801989209**
Option 4 ID : **6306801989211**
Status : **Answered**
Chosen Option : **4**

Q.27 The Dittus-Boelter equation, used for calculating the Nusselt number for turbulent flow in tubes, is given by $N_u = 0.023(Re)^m(Pr)^n$. For heating of fluids (where fluid temperature increases along the flow direction), what are the values of m and n respectively?

Ans

✗ 1. 0.7, 0.3

✗ 2. 0.4, 0.6

✗ 3. 0.3, 0.7

✓ 4. 0.8, 0.3

Question ID : **630680509015**
Option 1 ID : **6306801989358**
Option 2 ID : **6306801989359**
Option 3 ID : **6306801989357**
Option 4 ID : **6306801989356**
Status : **Answered**
Chosen Option : **4**

Q.28 In an isochoric process (constant volume), what is the relationship between heat transfer Q and the change in internal energy ΔU?

Ans

✗ 1. $Q > \Delta U$

✗ 2. $Q = 0$

✗ 3. $Q < \Delta U$

✓ 4. $Q = \Delta U$

Question ID : **630680509022**
Option 1 ID : **6306801989387**
Option 2 ID : **6306801989384**
Option 3 ID : **6306801989386**
Option 4 ID : **6306801989385**
Status : **Answered**
Chosen Option : **4**

Q.29 The velocity ratio of which gear train can be determined by methods like tabular method and algebraic method?

Ans
✗ 1. Simple gear train
✗ 2. Compound gear train
✓ 3. Epicyclic gear train
✗ 4. Reverted gear train

Question ID : **630680508983**
Option 1 ID : **6306801989230**
Option 2 ID : **6306801989231**
Option 3 ID : **6306801989228**
Option 4 ID : **6306801989229**
Status : **Answered**
Chosen Option : **1**

Q.30 The Vickers Hardness Test uses a diamond indenter with a shape of:

Ans
✗ 1. Triangle pyramid
✗ 2. Hexagonal pyramid
✓ 3. Square pyramid
✗ 4. Rectangular pyramid

Question ID : **630680508975**
Option 1 ID : **6306801989197**
Option 2 ID : **6306801989199**
Option 3 ID : **6306801989196**
Option 4 ID : **6306801989198**
Status : **Answered**
Chosen Option : **3**

Q.31 If two cylindrical shafts are made of the same material and have the same length, but one shaft has twice the diameter of the other, by what factor is the torsional stiffness of the larger shaft greater than the smaller one?

Ans
✗ 1. 4
✓ 2. 16
✗ 3. 2
✗ 4. 8

Question ID : **630680508970**
Option 1 ID : **6306801989177**
Option 2 ID : **6306801989179**
Option 3 ID : **6306801989176**
Option 4 ID : **6306801989178**
Status : **Answered**
Chosen Option : **2**

Q.32 In the Box-Jenkins (ARIMA) forecasting model, what does the term 'I' stand for?

Ans
✗ 1. Iteration
✓ 2. Integrated
✗ 3. Intrinsic
✗ 4. Interval

Question ID : **630680509048**
Option 1 ID : **6306801989491**
Option 2 ID : **6306801989490**
Option 3 ID : **6306801989488**
Option 4 ID : **6306801989489**
Status : **Answered**
Chosen Option : **2**

Q.33 Which of the following best describes an isobaric process in a closed system?

Ans
✗ 1. The temperature of the system remains constant.
✗ 2. The entropy of the system remains constant.
✓ 3. The pressure of the system remains constant.
✗ 4. The volume of the system remains constant.

Question ID : **630680509019**
Option 1 ID : **6306801989374**
Option 2 ID : **6306801989373**
Option 3 ID : **6306801989372**
Option 4 ID : **6306801989375**
Status : **Answered**
Chosen Option : **3**

Q.34 The train value $\frac{N_2}{N_1} = \frac{T_1}{T_2}$ is associated to:

Ans
✗ 1. Compound gear train
✓ 2. Simple gear train
✗ 3. Reverted gear train
✗ 4. Epicyclic gear train

Question ID : **630680508980**
Option 1 ID : **6306801989219**
Option 2 ID : **6306801989218**
Option 3 ID : **6306801989216**
Option 4 ID : **6306801989217**
Status : **Answered**
Chosen Option : **2**

Q.35 **Which of the following is NOT a valid assumption while analyzing bending stresses in beams using the Euler-Bernoulli beam theory?**

Ans
✔ 1. The beam is subjected to axial stresses only.
✘ 2. The material is isotropic.
✘ 3. The stress-strain relationship is linear.
✘ 4. Plane sections before bending remain plane after bending.

Question ID : **630680508969**
Option 1 ID : **6306801989173**
Option 2 ID : **6306801989172**
Option 3 ID : **6306801989174**
Option 4 ID : **6306801989175**
Status : **Answered**
Chosen Option : **4**

Q.36 **A free-body diagram is a representation that:**

Ans
✘ 1. Depicts the motion trajectory of a body.
✘ 2. Shows only the applied forces on a body.
✔ 3. Illustrates all forces acting on a body including gravitational force.
✘ 4. Displays only the internal forces in a system.

Question ID : **630680508962**
Option 1 ID : **6306801989144**
Option 2 ID : **6306801989147**
Option 3 ID : **6306801989146**
Option 4 ID : **6306801989145**
Status : **Answered**
Chosen Option : **3**

Q.37 **In a rotational flow of an incompressible fluid, which component of the acceleration is always zero?**

Ans
✘ 1. Centripetal acceleration
✔ 2. Tangential acceleration
✘ 3. Convective acceleration
✘ 4. Radial acceleration

Question ID : **630680509006**
Option 1 ID : **6306801989322**
Option 2 ID : **6306801989321**
Option 3 ID : **6306801989320**
Option 4 ID : **6306801989323**
Status : **Answered**
Chosen Option : **3**

Q.38 In the dynamics of machines, unbalanced forces due to reciprocating masses can mostly lead to:

Ans
✔ 1. Vibrations
✘ 2. Torque variation
✘ 3. Reduced angular momentum
✘ 4. Centrifugal force

Question ID : **630680508981**
Option 1 ID : **6306801989221**
Option 2 ID : **6306801989220**
Option 3 ID : **6306801989223**
Option 4 ID : **6306801989222**
Status : **Answered**
Chosen Option : **2**

Q.39 For a given material and shaft geometry, which factor primarily affects the torsional stiffness?

Ans
✘ 1. Yield Strength
✘ 2. Modulus of Elasticity
✘ 3. Ultimate Tensile Strength
✔ 4. Modulus of Rigidity

Question ID : **630680508971**
Option 1 ID : **6306801989183**
Option 2 ID : **6306801989181**
Option 3 ID : **6306801989182**
Option 4 ID : **6306801989180**
Status : **Answered**
Chosen Option : **4**

Q.40 In a positively skewed distribution:

Ans
✘ 1. The mode is always greater than the median.
✔ 2. The mean is always greater than the mode.
✘ 3. The median is always equal to the mode.
✘ 4. The mode is the highest value among mean, median, and mode.

Question ID : **630680509057**
Option 1 ID : **6306801989526**
Option 2 ID : **6306801989527**
Option 3 ID : **6306801989525**
Option 4 ID : **6306801989524**
Status : **Answered**
Chosen Option : **2**

Q.41 Which of the following methods of forecasting adjusts forecasts for both linear trend and seasonality effects using a third smoothing parameter?

Ans
✗ 1. Moving Averages
✗ 2. Delphi Method
✗ 3. Sectional smoothing
✓ 4. Winter's Exponential Smoothing

Question ID : **630680509053**
Option 1 ID : **6306801989508**
Option 2 ID : **6306801989509**
Option 3 ID : **6306801989510**
Option 4 ID : **6306801989511**
Status : **Answered**
Chosen Option : **3**

Q.42 The Grashof number (Gr) is used in natural convection problems and relates which of the following forces?

Ans
✓ 1. Buoyancy to viscous forces
✗ 2. Surface tension to inertial forces
✗ 3. Inertial to viscous forces
✗ 4. Viscous to elastic forces

Question ID : **630680509004**
Option 1 ID : **6306801989314**
Option 2 ID : **6306801989313**
Option 3 ID : **6306801989312**
Option 4 ID : **6306801989315**
Status : **Answered**
Chosen Option : **1**

Q.43 When designing for dynamic loading, the Goodman line is used to predict failure by accounting for both mean and alternating stresses. The Goodman line can be most accurately described as:

Ans
✗ 1. A horizontal line in the mean stress versus alternating stress plot
✗ 2. A parabolic curve in the mean stress versus alternating stress plot
✗ 3. A vertical line in the mean stress versus alternating stress plot
✓ 4. A linearly decreasing line in the mean stress versus alternating stress plot

Question ID : **630680508988**
Option 1 ID : **6306801989248**
Option 2 ID : **6306801989249**
Option 3 ID : **6306801989251**
Option 4 ID : **6306801989250**
Status : **Answered**
Chosen Option : **4**

Q.44 Which of the following factors DOES NOT influence the level of safety stock in an inventory control system?

Ans
✗ 1. Lead time variability
✗ 2. Supplier reliability
✗ 3. Demand variability
✓ 4. Inventory turnover ratio

Question ID : **630680509050**
Option 1 ID : **6306801989498**
Option 2 ID : **6306801989497**
Option 3 ID : **6306801989499**
Option 4 ID : **6306801989496**
Status : **Answered**
Chosen Option : **4**

Q.45 One of the main drawbacks of a centrifugal clutch is:

Ans
✗ 1. it is not specialized to perform shockless acceleration
✗ 2. it doesn't have the feature of greater engagement
✓ 3. it cannot create high torque
✗ 4. it requires a complex electronic control system

Question ID : **630680509000**
Option 1 ID : **6306801989296**
Option 2 ID : **6306801989299**
Option 3 ID : **6306801989298**
Option 4 ID : **6306801989297**
Status : **Answered**
Chosen Option : **1**

Q.46 Which type of casting is best suited for producing intricate designs and detailed patterns in mass production?

Ans
✗ 1. Sand casting
✗ 2. Centrifugal casting
✓ 3. Die casting
✗ 4. Investment casting

Question ID : **630680509035**
Option 1 ID : **6306801989438**
Option 2 ID : **6306801989439**
Option 3 ID : **6306801989436**
Option 4 ID : **6306801989437**
Status : **Answered**
Chosen Option : **3**

Q.47 For a riveted joint where the primary concern is shearing of rivets, which of the following rivet material properties is the most critical?

Ans
✗ 1. Fatigue strength
✗ 2. Tensile strength
✗ 3. Creep resistance
✓ 4. Shear strength

Question ID : **630680508989**
Option 1 ID : **6306801989254**
Option 2 ID : **6306801989252**
Option 3 ID : **6306801989255**
Option 4 ID : **6306801989253**
Status : **Answered**
Chosen Option : **4**

Q.48 In the context of fins, the "Fin Efficiency" is defined as the ratio of:

Ans
✓ 1. Actual heat transfer from the fin to the maximum possible heat transfer.
✗ 2. Heat transfer from the fin to the heat transfer from the base
✗ 3. Heat transfer from the fin tip to the heat transfer from the base.
✗ 4. Heat transfer from the base to the ambient temperature.

Question ID : **630680509011**
Option 1 ID : **6306801989340**
Option 2 ID : **6306801989342**
Option 3 ID : **6306801989341**
Option 4 ID : **6306801989343**
Status : **Answered**
Chosen Option : **1**

Q.49 Given a data set with an odd number of observations that is symmetrically distributed, which of the following statements is true?

Ans
✗ 1. The mean is always greater than the median.
✓ 2. The mean, median, and mode are all equal.
✗ 3. The mode is always greater than the median.
✗ 4. The median is always at the midpoint of the range.

Question ID : **630680509055**
Option 1 ID : **6306801989517**
Option 2 ID : **6306801989516**
Option 3 ID : **6306801989518**
Option 4 ID : **6306801989519**
Status : **Answered**
Chosen Option : **4**

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Q.50 In laminar flow over a flat plate, how does the thermal boundary layer thickness, δ_t, vary with respect to the distance, x, from the leading edge?

Ans

✗ 1. $\delta_t \propto 1/\sqrt{x}$

✗ 2. $\delta_t \propto x$

✗ 3. $\delta_t \propto x^2$

✓ 4. $\delta_t \propto \sqrt{x}$

Question ID : **630680509014**
Option 1 ID : **6306801989354**
Option 2 ID : **6306801989352**
Option 3 ID : **6306801989355**
Option 4 ID : **6306801989353**
Status : **Answered**
Chosen Option : **4**

Q.51 **Under which of the following conditions does a real gas behave most like an ideal gas?**

Ans

✗ 1. Low pressure and low temperature

✗ 2. High pressure and low temperature

✗ 3. High pressure and high temperature

✓ 4. Low pressure and high temperature

Question ID : **630680509021**
Option 1 ID : **6306801989382**
Option 2 ID : **6306801989380**
Option 3 ID : **6306801989381**
Option 4 ID : **6306801989383**
Status : **Answered**
Chosen Option : **4**

Q.52 **One way to reduce the peak pressures in a Diesel engine (without altering the overall compression ratio) is to:**

Ans

✗ 1. Increase the cut-off ratio.

✗ 2. Increase the time of injection.

✓ 3. Introduce the fuel earlier in the compression process.

✗ 4. Reduce the fuel quantity injected.

Question ID : **630680509029**
Option 1 ID : **6306801989412**
Option 2 ID : **6306801989413**
Option 3 ID : **6306801989415**
Option 4 ID : **6306801989414**
Status : **Answered**
Chosen Option : **2**

Q.53 A set of data consists of five distinct positive integers. If the mean of the data set is 10 and the standard deviation is 0, which of the following could be true?

Ans
✗ 1. The range of the data is greater than 10.
✗ 2. One of the values is 50.
✓ 3. All values in the data set are 10.
✗ 4. The median is 5.

Question ID : **630680509056**
Option 1 ID : **6306801989523**
Option 2 ID : **6306801989520**
Option 3 ID : **6306801989522**
Option 4 ID : **6306801989521**
Status : **Answered**
Chosen Option : **3**

Q.54 Which of the following properties of engineering materials describes the total amount of energy that a material can absorb before it fractures?

Ans
✗ 1. Elasticity
✗ 2. Shining
✗ 3. Plasticity
✓ 4. Toughness

Question ID : **630680509032**
Option 1 ID : **6306801989427**
Option 2 ID : **6306801989424**
Option 3 ID : **6306801989425**
Option 4 ID : **6306801989426**
Status : **Answered**
Chosen Option : **4**

Q.55 The Rayleigh number in free convection scenarios is essential to predict the onset of turbulence. Which of the following dimensionless groups is represented by the Rayleigh number?

Ans
✓ 1. Product of Grashof and Prandtl numbers
✗ 2. Product of Reynolds and Prandtl numbers
✗ 3. Ratio of advection to diffusion
✗ 4. Ratio of conduction to convection

Question ID : **630680509013**
Option 1 ID : **6306801989351**
Option 2 ID : **6306801989350**
Option 3 ID : **6306801989348**
Option 4 ID : **6306801989349**
Status : **Answered**
Chosen Option : **1**

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Q.56 The Buckingham π theorem in dimensional analysis states that if a physical process involves n variables and k fundamental dimensions, the number of dimensionless groups (π terms) that can be formed is:

Ans

✗ 1. $\frac{n}{k}$

✓ 2. $n-k$

✗ 3. $n+k$

✗ 4. $\frac{k}{n}$

Question ID : **630680509005**
Option 1 ID : **6306801989318**
Option 2 ID : **6306801989319**
Option 3 ID : **6306801989316**
Option 4 ID : **6306801989317**
Status : **Answered**
Chosen Option : **2**

Q.57 **A cantilever beam subjected to a uniformly distributed load (UDL) along its entire length will have its maximum bending moment at**

Ans

✗ 1. one-fourth of the span from the free end

✗ 2. the free end

✗ 3. the mid-span

✓ 4. the fixed end

Question ID : **630680508968**
Option 1 ID : **6306801989171**
Option 2 ID : **6306801989168**
Option 3 ID : **6306801989169**
Option 4 ID : **6306801989170**
Status : **Answered**
Chosen Option : **4**

Q.58 In an adiabatic process, which of the following statements is true regarding the relationship between work W and the change in internal energy of the system?

Ans

✗ 1. $\Delta U < W$

✓ 2. $\Delta U = -W$

✗ 3. $\Delta U > W$

✗ 4. $W = 0$

Question ID : **630680509018**
Option 1 ID : **6306801989371**
Option 2 ID : **6306801989369**
Option 3 ID : **6306801989370**
Option 4 ID : **6306801989368**
Status : **Answered**
Chosen Option : **2**

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Q.59 **The Prandtl number (Pr) is crucial in understanding the relative growth of the hydrodynamic and thermal boundary layers. When Pr> 1, which of the following statements is true?**

Ans

✗ 1. The thermal boundary layer grows faster than the hydrodynamic boundary layer.

✗ 2. The growth rates of the boundary layers are unrelated.

✗ 3. Both boundary layers grow at the same rate.

✓ 4. The hydrodynamic boundary layer grows faster than the thermal boundary layer.

Question ID : **630680509012**
Option 1 ID : **6306801989347**
Option 2 ID : **6306801989345**
Option 3 ID : **6306801989344**
Option 4 ID : **6306801989346**
Status : **Answered**
Chosen Option : **4**

Q.60 **In metal forming processes, what is the primary mechanism behind Superplastic forming?**

Ans

✗ 1. Diffusion

✗ 2. Elastic deformation

✓ 3. Grain boundary sliding

✗ 4. Dislocation motion

Question ID : **630680509040**
Option 1 ID : **6306801989459**
Option 2 ID : **6306801989457**
Option 3 ID : **6306801989458**
Option 4 ID : **6306801989456**
Status : **Answered**
Chosen Option : **2**

Q.61 Three identical beams are connected in parallel. If the total deflection experienced by the system under a load P is δ_{total}, which of the following relations is true considering δ is the deflection of one beam?

Ans

✗ 1. $\delta_{total} = \frac{3}{\delta}$

✓ 2. $\delta_{total} = \delta$

✗ 3. $\delta_{total} = 3\delta$

✗ 4. $\delta_{total} = \frac{\delta}{3}$

Question ID : **630680508967**
Option 1 ID : **6306801989167**
Option 2 ID : **6306801989164**
Option 3 ID : **6306801989165**
Option 4 ID : **6306801989166**
Status : **Answered**
Chosen Option : **2**

Q.62 Von Mises-Hencky theory, often used in design for ductile materials under complex stress states, is also commonly referred to as:

Ans
✗ 1. Maximum principal stress theory
✗ 2. Shear stress theory
✓ 3. Distortion energy theory
✗ 4. Maximum strain theory

Question ID : **630680508990**
Option 1 ID : **6306801989258**
Option 2 ID : **6306801989257**
Option 3 ID : **6306801989259**
Option 4 ID : **6306801989256**
Status : **Answered**
Chosen Option : **3**

Q.63 Which of the following gating system components is the most critical that controls the rate of entry of metal into mold?

Ans
✗ 1. Pouring basin
✓ 2. Sprue
✗ 3. Gate-on
✗ 4. Runner

Question ID : **630680509038**
Option 1 ID : **6306801989448**
Option 2 ID : **6306801989449**
Option 3 ID : **6306801989451**
Option 4 ID : **6306801989450**
Status : **Answered**
Chosen Option : **4**

Q.64 Which of the following heat treatment processes is primarily used to relieve internal stresses in materials?

Ans
✗ 1. Tempering
✓ 2. Annealing
✗ 3. Normalizing
✗ 4. Quenching

Question ID : **630680509034**
Option 1 ID : **6306801989434**
Option 2 ID : **6306801989433**
Option 3 ID : **6306801989432**
Option 4 ID : **6306801989435**
Status : **Answered**
Chosen Option : **3**

Q.65 For which of the following material, the typical S-N curve indicates that the stress at failure continues to decrease as the number of cycle increases?

Ans
✔ 1. Aluminium alloys
✘ 2. Wrought iron
✘ 3. Ferrous materials
✘ 4. Polymers

Question ID : **630680508986**
Option 1 ID : **6306801989243**
Option 2 ID : **6306801989242**
Option 3 ID : **6306801989240**
Option 4 ID : **6306801989241**
Status : **Answered**
Chosen Option : **3**

Q.66 The Rankine cycle efficiency can be improved with the use of superheating. Which of the following statements is NOT a reason for this improvement?

Ans
✘ 1. The specific volume of the steam increases, which increases the turbine work output.
✘ 2. It increases the average temperature at which heat is added to the working fluid.
✘ 3. Superheating reduces the moisture content at the turbine exit.
✔ 4. It increases the latent heat of vaporization for the working fluid.

Question ID : **630680509024**
Option 1 ID : **6306801989392**
Option 2 ID : **6306801989393**
Option 3 ID : **6306801989395**
Option 4 ID : **6306801989394**
Status : **Answered**
Chosen Option : **4**

Q.67 Which end condition for a column result in the shortest effective length and hence the highest critical buckling load?

Ans
✔ 1. Both ends fixed.
✘ 2. One end pinned and the other free.
✘ 3. Both ends pinned.
✘ 4. One end fixed and the other free.

Question ID : **630680508974**
Option 1 ID : **6306801989193**
Option 2 ID : **6306801989195**
Option 3 ID : **6306801989192**
Option 4 ID : **6306801989194**
Status : **Answered**
Chosen Option : **1**

Q.68 In which type of gear arrangement is the axis of the two shafts neither parallel nor intersecting?

Ans
✗ 1. Spur gears
✓ 2. Hypoid gears
✗ 3. Helical gears
✗ 4. Bevel gears

Question ID : **630680508979**
Option 1 ID : **6306801989214**
Option 2 ID : **6306801989212**
Option 3 ID : **6306801989215**
Option 4 ID : **6306801989213**
Status : **Answered**
Chosen Option : **2**

Q.69 The compressibility factor (Z) for an ideal gas is:

Ans
✗ 1. Less than 1
✗ 2. Greater than 1
✓ 3. Equal to 1
✗ 4. Equal to 0

Question ID : **630680509025**
Option 1 ID : **6306801989398**
Option 2 ID : **6306801989397**
Option 3 ID : **6306801989399**
Option 4 ID : **6306801989396**
Status : **Answered**
Chosen Option : **3**

Q.70 In the design of a shaft, the presence of keyways, holes, or other notches can introduce stress concentrations. What is the typical method to compensate for these stress concentrations?

Ans
✗ 1. Applying a surface treatment to the notched region
✓ 2. Introducing fillets at the root of notches
✗ 3. Using materials with higher elasticity
✗ 4. Increasing the shaft diameter proportionally to the notch depth

Question ID : **630680508994**
Option 1 ID : **6306801989272**
Option 2 ID : **6306801989275**
Option 3 ID : **6306801989273**
Option 4 ID : **6306801989274**
Status : **Answered**
Chosen Option : **3**

Q.71 Which casting process involves creating a wax pattern, which is subsequently surrounded by a ceramic slurry to form a mold?

Ans
✗ 1. Permanent mold casting
✗ 2. Sand casting
✓ 3. Investment casting
✗ 4. Shell molding

Question ID : **630680509039**
Option 1 ID : **6306801989453**
Option 2 ID : **6306801989454**
Option 3 ID : **6306801989452**
Option 4 ID : **6306801989455**
Status : **Answered**
Chosen Option : **3**

Q.72 The Bell Coleman cycle, commonly used for air refrigeration, operates on the principle of which thermodynamic cycle?

Ans
✓ 1. Brayton cycle
✗ 2. Carnot cycle
✗ 3. Diesel cycle
✗ 4. Otto cycle

Question ID : **630680509030**
Option 1 ID : **6306801989417**
Option 2 ID : **6306801989418**
Option 3 ID : **6306801989416**
Option 4 ID : **6306801989419**
Status : **Answered**
Chosen Option : **1**

Q.73 Consider a composite bar made of steel and brass, fixed at both ends. If the assembly is heated, which of the following statements is true regarding the thermal stresses?

Ans
✗ 1. Both materials will develop the same thermal stresses because they are subjected to the same temperature change.
✗ 2. There will be no thermal stresses in either material because the bar is free to expand.
✓ 3. Brass will develop higher thermal stresses because it has a higher coefficient of thermal expansion than steel.
✗ 4. Steel will develop higher thermal stresses because it has a higher coefficient of thermal expansion than brass.

Question ID : **630680508966**
Option 1 ID : **6306801989162**
Option 2 ID : **6306801989160**
Option 3 ID : **6306801989163**
Option 4 ID : **6306801989161**
Status : **Answered**
Chosen Option : **4**

Q.74 Which of the following components is NOT typically found in a basic heat pump cycle?

Ans
✗ 1. Evaporator
✗ 2. Compressor
✗ 3. Expansion valve
✓ 4. Combustion chamber

Question ID : **630680509031**
Option 1 ID : **6306801989422**
Option 2 ID : **6306801989421**
Option 3 ID : **6306801989423**
Option 4 ID : **6306801989420**
Status : **Answered**
Chosen Option : **4**

Q.75 Knuckle pins are classified as which type of sliding contact bearing motion?

Ans
✗ 1. Reciprocating
✗ 2. Centrifugal
✗ 3. Rotating
✓ 4. Oscillating

Question ID : **630680508996**
Option 1 ID : **6306801989280**
Option 2 ID : **6306801989283**
Option 3 ID : **6306801989281**
Option 4 ID : **6306801989282**
Status : **Answered**
Chosen Option : **3**

Q.76 The primary unbalanced force of reciprocating masses is usually counteracted by:

Ans
✗ 1. increasing engine speed.
✓ 2. balancing weights on the rotating shaft.
✗ 3. using dampers.
✗ 4. distributing reciprocating masses evenly around the axis of rotation.

Question ID : **630680508985**
Option 1 ID : **6306801989236**
Option 2 ID : **6306801989237**
Option 3 ID : **6306801989238**
Option 4 ID : **6306801989239**
Status : **Answered**
Chosen Option : **2**

Q.77 A material that can be drawn into wires under tension without breaking is said to have:

Ans
✗ 1. Stiffness
✗ 2. Brittleness
✗ 3. Hardness
✓ 4. Ductility

Question ID : **630680509033**
Option 1 ID : **6306801989429**
Option 2 ID : **6306801989430**
Option 3 ID : **6306801989428**
Option 4 ID : **6306801989431**
Status : **Answered**
Chosen Option : **4**

Q.78 In a centrifugal clutch, as the engine speed increases, the contact force between the clutch shoes and the drum

Ans
✗ 1. increases linearly
✗ 2. remains constant
✓ 3. increases due to centrifugal force
✗ 4. decreases exponentially

Question ID : **630680508998**
Option 1 ID : **6306801989289**
Option 2 ID : **6306801989290**
Option 3 ID : **6306801989291**
Option 4 ID : **6306801989288**
Status : **Answered**
Chosen Option : **4**

Q.79 For a system with multiple particles, D'Alembert's principle can be applied

Ans
✓ 1. to each particle individually.
✗ 2. only to the system as a whole.
✗ 3. only to the center of mass of the system.
✗ 4. only when all particles have equal masses.

Question ID : **630680508964**
Option 1 ID : **6306801989152**
Option 2 ID : **6306801989153**
Option 3 ID : **6306801989154**
Option 4 ID : **6306801989155**
Status : **Answered**
Chosen Option : **1**

Q.80 In the Otto cycle, the compression and expansion processes are theoretically modeled as:

Ans
✗ 1. Isothermal processes
✗ 2. Isobaric processes
✗ 3. Isochoric processes
✓ 4. Adiabatic processes

Question ID : **630680509027**
Option 1 ID : **6306801989405**
Option 2 ID : **6306801989406**
Option 3 ID : **6306801989407**
Option 4 ID : **6306801989404**
Status : **Answered**
Chosen Option : **3**

Q.81 Chvorinov's Rule relates the solidification time of a casting to:

Ans
✓ 1. the ratio of the volume of the casting to its surface area.
✗ 2. The type of alloy used.
✗ 3. The surface area of the casting only.
✗ 4. the ratio of the square of volume of the casting to its surface area.

Question ID : **630680509041**
Option 1 ID : **6306801989463**
Option 2 ID : **6306801989461**
Option 3 ID : **6306801989460**
Option 4 ID : **6306801989462**
Status : **Answered**
Chosen Option : **4**

Q.82 A plank is placed on two supports, one at each end. If a person stands at the midpoint of the plank, where will the greatest reaction force occur?

Ans
✗ 1. On the support where the person is standing
✗ 2. On the support opposite to where the person is standing
✗ 3. Neither, as the plank will tilt
✓ 4. On both supports equally

Question ID : **630680508959**
Option 1 ID : **6306801989133**
Option 2 ID : **6306801989132**
Option 3 ID : **6306801989134**
Option 4 ID : **6306801989135**
Status : **Answered**
Chosen Option : **4**

Q.83 What defines the Fundamental Deviation in the system of limits and fits?

Ans
✗ 1. The largest difference between the actual size and the basic size.
✓ 2. The position of tolerance zone in relation to the basic size.
✗ 3. Algebraic difference between actual size and corresponding basic size.
✗ 4. The difference between the minimum size and the basic size

Question ID : **630680509047**
Option 1 ID : **6306801989486**
Option 2 ID : **6306801989484**
Option 3 ID : **6306801989485**
Option 4 ID : **6306801989487**
Status : **Answered**
Chosen Option : **4**

Q.84 Which one of the following is a thrust bearing?

Ans
✗ 1. Partial journal bearings
✗ 2. Full journal bearings
✓ 3. Collar bearings
✗ 4. Steep bearings

Question ID : **630680508995**
Option 1 ID : **6306801989278**
Option 2 ID : **6306801989277**
Option 3 ID : **6306801989276**
Option 4 ID : **6306801989279**
Status : **Answered**
Chosen Option : **3**

Q.85 If a transportation problem is solved using the Vogel's Approximation Method (VAM), which of the following criteria primarily influences the initial allocations?

Ans
✗ 1. The center-most cell in the transportation matrix.
✗ 2. The maximum cost in the transportation matrix.
✓ 3. The difference between the two smallest costs in each row or column.
✗ 4. The demand and supply ratio for each row and column.

Question ID : **630680509052**
Option 1 ID : **6306801989505**
Option 2 ID : **6306801989506**
Option 3 ID : **6306801989507**
Option 4 ID : **6306801989504**
Status : **Answered**
Chosen Option : **3**

Q.86 In Ultrasonic Machining (USM), which type of transducer is used?

Ans
✗ 1. Semi-quartz
✗ 2. Electro-strictive
✗ 3. High power sine wave
✓ 4. Piezoelectric

Question ID : **630680509044**
Option 1 ID : **6306801989475**
Option 2 ID : **6306801989473**
Option 3 ID : **6306801989472**
Option 4 ID : **6306801989474**
Status : **Answered**
Chosen Option : **3**

Q.87 For a floating body in equilibrium, the metacenter lies

Ans
✗ 1. below both the center of gravity and the center of buoyancy.
✓ 2. above both the center of gravity and the center of buoyancy.
✗ 3. below the center of gravity but above the center of buoyancy.
✗ 4. above the center of gravity and below the center of buoyancy.

Question ID : **630680509002**
Option 1 ID : **6306801989304**
Option 2 ID : **6306801989305**
Option 3 ID : **6306801989306**
Option 4 ID : **6306801989307**
Status : **Answered**
Chosen Option : **2**

Q.88 Why is tool wear generally more consistent and predictable in multi-point cutting tools compared to single-point cutting tools?

Ans
✗ 1. Single-point tools have a more complex geometry.
✓ 2. Multi-point tools distribute the cutting load over multiple edges.
✗ 3. Single-point tools are usually made of softer materials.
✗ 4. Multi-point tools operate at lower speeds.

Question ID : **630680509043**
Option 1 ID : **6306801989469**
Option 2 ID : **6306801989468**
Option 3 ID : **6306801989470**
Option 4 ID : **6306801989471**
Status : **Answered**
Chosen Option : **2**

Q.89 What is the primary purpose of using alloying elements in powder metallurgy?

Ans
✔ 1. To enhance the final properties of the sintered product.
✘ 2. To facilitate easier compaction of powders.
✘ 3. To reduce the sintering temperature.
✘ 4. To improve the flowability of the powder.

Question ID : **630680509045**
Option 1 ID : **6306801989479**
Option 2 ID : **6306801989478**
Option 3 ID : **6306801989477**
Option 4 ID : **6306801989476**
Status : **Answered**
Chosen Option : **1**

Q.90 A lamina is said to be in rotational equilibrium when _____.

Ans
✘ 1. It rotates with constant angular velocity
✘ 2. There is no net force acting on it
✔ 3. There is no net torque or moment acting about any point
✘ 4. The gravitational force is acting at its center

Question ID : **630680508958**
Option 1 ID : **6306801989128**
Option 2 ID : **6306801989129**
Option 3 ID : **6306801989130**
Option 4 ID : **6306801989131**
Status : **Answered**
Chosen Option : **1**

Q.91 During the simplex method, when can degeneracy occurs, and what is its implication?

Ans
✘ 1. It occurs when there are no constraints, leading to unlimited solutions.
✘ 2. It occurs when all coefficients in the objective function row are negative, indicating optimality.
✘ 3. It occurs when the pivot element cannot be found, leading to no feasible solution.
✔ 4. It occurs when a basic variable's coefficient becomes zero, possibly leading to cycling.

Question ID : **630680509051**
Option 1 ID : **6306801989500**
Option 2 ID : **6306801989503**
Option 3 ID : **6306801989501**
Option 4 ID : **6306801989502**
Status : **Answered**
Chosen Option : **2**

Q.92 For a closed system undergoing a process between two specified states, the decrease in availability (or exergy) of the system is always:

Ans
✗ 1. Less than the heat transfer to the system
✗ 2. Greater than the irreversibility of the system
✗ 3. Zero, since availability is a conserved property
✓ 4. Equal to the irreversibility of the system

Question ID : **630680509020**
Option 1 ID : **6306801989377**
Option 2 ID : **6306801989376**
Option 3 ID : **6306801989379**
Option 4 ID : **6306801989378**
Status : **Answered**
Chosen Option : **4**

Q.93 For one-dimensional, steady-state heat conduction through a plane wall without heat generation and with constant thermal conductivity, which of the following statements is TRUE regarding the temperature distribution across the wall?

Ans
✗ 1. The temperature remains constant across the wall.
✓ 2. The temperature distribution is linear.
✗ 3. The temperature increases exponentially across the wall.
✗ 4. The temperature distribution is exponential.

Question ID : **630680509009**
Option 1 ID : **6306801989332**
Option 2 ID : **6306801989335**
Option 3 ID : **6306801989333**
Option 4 ID : **6306801989334**
Status : **Answered**
Chosen Option : **2**

Q.94 For a fully reversed loading condition in an S-N diagram, the mean stress is:

Ans
✓ 1. Zero
✗ 2. Equal to the maximum stress
✗ 3. Negative
✗ 4. Equal to half of the maximum stress

Question ID : **630680508987**
Option 1 ID : **6306801989244**
Option 2 ID : **6306801989246**
Option 3 ID : **6306801989245**
Option 4 ID : **6306801989247**
Status : **Answered**
Chosen Option : **1**

Q.95 **Convective acceleration in fluid dynamics is due to:**

Ans
✔ 1. the spatial variation in velocity along the flow direction.
✘ 2. viscous forces acting on the fluid.
✘ 3. the time rate of change of fluid velocity at a point.
✘ 4. the gravitational forces acting on the fluid.

Question ID : **630680509003**
Option 1 ID : **6306801989308**
Option 2 ID : **6306801989311**
Option 3 ID : **6306801989310**
Option 4 ID : **6306801989309**
Status : **Answered**
Chosen Option : **1**

Q.96 **The critical radius of insulation for a cylindrical object, like a pipe, is the radius at which:**

Ans
✘ 1. the heat transfer rate is minimized.
✘ 2. the inner surface temperature is minimized.
✔ 3. the heat transfer rate is maximized.
✘ 4. the outer surface temperature is maximized.

Question ID : **630680509008**
Option 1 ID : **6306801989331**
Option 2 ID : **6306801989329**
Option 3 ID : **6306801989330**
Option 4 ID : **6306801989328**
Status : **Answered**
Chosen Option : **3**

Q.97 **In the cooling curve of a pure metal, the plateau represents:**

Ans
✔ 1. The temperature range where both solid and liquid phases coexist
✘ 2. The latent heat of fusion
✘ 3. The temperature at which the metal is fully solid
✘ 4. The time taken for complete solidification

Question ID : **630680509036**
Option 1 ID : **6306801989442**
Option 2 ID : **6306801989443**
Option 3 ID : **6306801989441**
Option 4 ID : **6306801989440**
Status : **Answered**
Chosen Option : **1**

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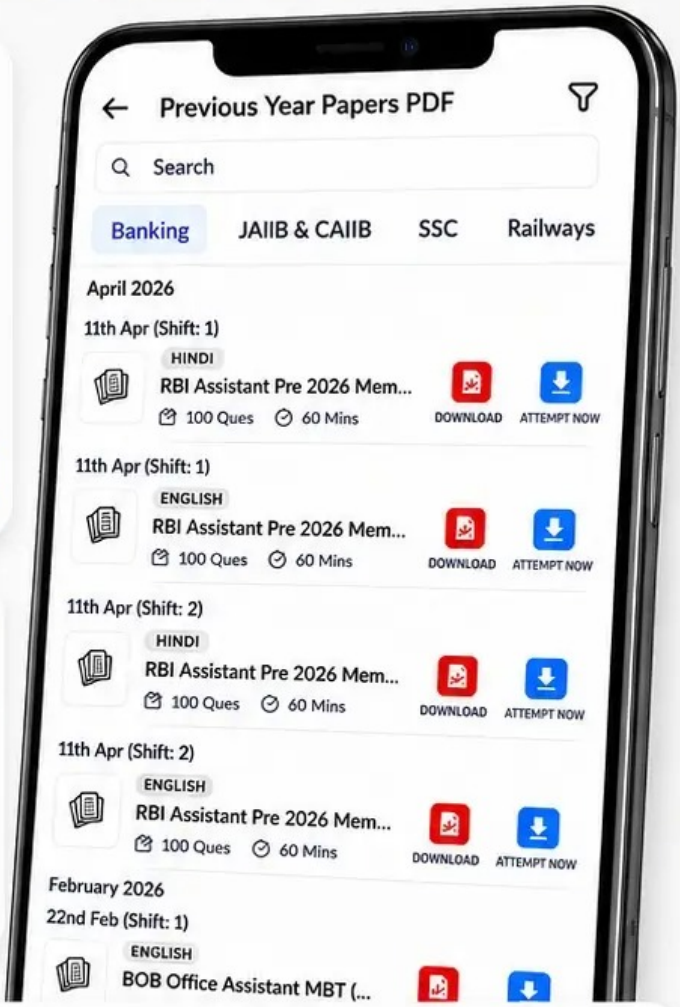
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Ved, SSC JE (Mech)

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Q.98 In a CPM analysis, "total float" refers to the

Ans ✔ 1. maximum time an activity can be delayed without delaying the project completion date.

✘ 2. buffer added to the project to account for uncertainties in activity durations.

✘ 3. time saved by performing activities in parallel.

✘ 4. difference between the earliest start and finish times of non-critical activities.

Question ID : **630680509054**
Option 1 ID : **6306801989513**
Option 2 ID : **6306801989514**
Option 3 ID : **6306801989512**
Option 4 ID : **6306801989515**
Status : **Answered**
Chosen Option : **1**

Q.99 Which dimensionless number is widely used in forced convection heat transfer and to decide on the type of flow as laminar or turbulent?

Ans ✘ 1. Biot number

✘ 2. Nusselt number

✔ 3. Reynolds number

✘ 4. Prandtl number

Question ID : **630680509007**
Option 1 ID : **6306801989327**
Option 2 ID : **6306801989325**
Option 3 ID : **6306801989324**
Option 4 ID : **6306801989326**
Status : **Answered**
Chosen Option : **3**

Q.100 In an axial flow compressor, the primary flow direction of the working fluid is:

Ans ✘ 1. radially inward.

✘ 2. perpendicular to the axis of rotation.

✘ 3. radially outward.

✔ 4. parallel to the axis of rotation.

Question ID : **630680509023**
Option 1 ID : **6306801989390**
Option 2 ID : **6306801989389**
Option 3 ID : **6306801989391**
Option 4 ID : **6306801989388**
Status : **Answered**
Chosen Option : **4**