Andhra Pradesh State Council of Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

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Mechanical Engineering

Group Number :	1
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Mechanical Engineering

Section Id :	75207661
Section Number :	1
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Sub-Section Number :	1
Sub-Section Id :	75207661
Question Shuffling Allowed :	Yes
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Question Number : 1 Question Id : 7520767201 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider an ideal vapour compression refrigeration cycle working on R-134a refrigerant. The COP of the cycle is 10 and the refrigeration capacity is 150 kJ/kg. The heat rejected by the refrigerant in the condenser is _____kJ/kg

Options :

1. ✔ 165

2. ✖ 148

3. ✖ 126

4. ✖ 137

Question Number : 2 Question Id : 7520767202 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The critical speed of a rotating shaft depends on

Options :

1. ✖ Mass and stiffness

2. ✖ Mass and eccentricity

3. ✖ Stiffness and eccentricity

4. ✔ Mass, stiffness and eccentricity

Question Number : 3 Question Id : 7520767203 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What happens to the total potential energy of a system if the external work done by applied loads is greater than the increase in internal strain energy?

Options :

1. ✔ The total potential energy decreases

2. ✖ The system is in unstable equilibrium

3. ✖ The material has exceeded its yield point

4. ✖ The system reaches a higher energy state

Question Number : 4 Question Id : 7520767204 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The truss which follows the law $n =$ _____ is known as simple truss

Options :

1. ✖ $n = 2j + 3$

2. ✔ $n = 2j - 3$

3. ✖ $n = 3j + 2$

4. ✖ $n = 3j - 2$

Question Number : 5 Question Id : 7520767205 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A solid uniform metal bar of diameter D and length L is hanging vertically from its upper end. The elongation of the bar due to self-weight is

Options :

1. ✔ Proportional to L and inversely proportional to D^2

2. ✖ Proportional to L^2 and inversely proportional to D^2

3. ✖ Proportional to L and independent to D

4. ✖ Proportional to D and inversely proportional to L^2

Question Number : 6 Question Id : 7520767206 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is NOT a characteristic of a transportation problem?

Options :

1. ✖ Supply and demand constraints

2. ✖ Minimization of transportation cost

3. ✔ Assignment of tasks to agents

4. ✖ Distribution of goods from sources to destinations

Question Number : 7 Question Id : 7520767207 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Determine the atmospheric pressure at a location where the barometric reading is 700 mmHg and the gravitational acceleration is $g = 10\ m/s^2$. Assume the mercury density is $14000\ kg/m^3$.

Options :

1. ✖ 200 kPa

2. ✖ 100 kPa

3. ✔ 98 kPa

4. ✖ 101.03 kPa

Question Number : 8 Question Id : 7520767208 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The control volume approach in fluid mechanics is primarily used to analyse:

Options :

1. ✖ Fluid properties at a point

2. ✔ Fluid flow across a defined region

3. ✖ Molecular interactions in fluids

4. ✖ Surface tension effects

Question Number : 9 Question Id : 7520767209 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following processes is an example of an isothermal process?

Options :

1. ✖ A gas expanding with no heat exchange and increasing temperature.

2. ✔ A gas expanding at constant temperature.

3. ✖ A gas compressed rapidly causing temperature to rise.

4. ✖ A gas heated at constant volume.

Question Number : 10 Question Id : 7520767210 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a Diesel cycle, the parameter that affects efficiency in addition to compression ratio is

Options :

1. ✔ Cut-off ratio

2. ✖ Pressure ratio

3. ✖ Heat rejection

4. ✖ Mean effective pressure

Question Number : 11 Question Id : 7520767211 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What happens to the entropy of a pure substance during a phase change at constant temperature and pressure?

Options :

1. ✖ It decreases.

2. ✖ It remains constant.

3. ✔ It increases.

It becomes zero.

4. ✖

Question Number : 12 Question Id : 7520767212 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In free convection, which dimensionless number represents the ratio of buoyancy forces to viscous forces?

Options :

Reynolds Number

1. ✖

Grashof Number

2. ✔

Prandtl Number

3. ✖

Nusselt Number

4. ✖

Question Number : 13 Question Id : 7520767213 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Angle of twist of a shaft of diameter ‘d’ is inversely proportional to

Options :

1. ✖ d
2. ✖ d^2
3. ✖ d^3
4. ✔ d^4

Question Number : 14 Question Id : 7520767214 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The ratio of modulus of rigidity to modulus of elasticity for a Poisson's ratio of 1 would be

Options :

1. ✖ 0.5

2. ✖ 0.4

3. ✔ 0.25

4. ✖ 1

Question Number : 15 Question Id : 7520767215 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A solid cylinder of diameter 100 mm and height 50 mm is forged between two frictionless flat dies to a height of 25 mm. The percentage change in diameter is

Options :

1. ✖ 0

2. ✖ 2.07

3. ✖ 20.7

4. ✔ 41.4

Question Number : 16 Question Id : 7520767216 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which dimensionless number characterizes the ratio of convective to conductive heat transfer in a fluid?

Options :

1. ✖ Reynolds number

2. ✖ Prandtl number

3. ✔ Nusselt number

4. ✖ Grashof number

Question Number : 17 Question Id : 7520767217 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

For an air refrigeration cycle, COP improves when

Options :

1. ✖ Compressor exit temperature increases

2. ✔ Turbine exit temperature decreases

3. ✖ Refrigeration temperature increases

4. ✖ Heat rejection temperature increases

Question Number : 18 Question Id : 7520767218 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the main cause of irreversibility in thermodynamic processes?

Options :

1. ✖ Perfect insulation.

2. ✔ Friction and unrestrained expansion.

3. ✖ Slow, quasi-static changes.

4. ✖ Reversible heat transfer.

Question Number : 19 Question Id : 7520767219 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a concentric tube counter flow heat exchanger, hot oil enters at 102 °C and leaves at 65 °C. Cold water at 25 °C and leaves at 42 °C.

The log mean temperature difference (LTMD) is _____

Options :

1. ✖ 65.25 °C

2. ✔ 49.32 °C

3. ✖ 74.12 °C

4. ✖ 102.6 °C

Question Number : 20 Question Id : 7520767220 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The criterion of static load carrying capacity is the permanent deformation of the parts of bearing. The limiting value of permanent deformation is

Options :

1. ✖ 0.001 of the ball diameter

2. ✔ 0.0001 of the ball diameter

3. ✖ 0.1 of the ball diameter

4. ✖ 0.01 of the ball diameter

Question Number : 21 Question Id : 7520767221 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the primary purpose of forecasting in production planning?

Options :

1. ✖ To determine the exact number of employees needed

2. ✔ To predict future demand for products or services

3. ✖ To schedule daily work shifts

4. ✖ To control inventory costs

Question Number : 22 Question Id : 7520767222 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In rolling of metals, when reduction per pass is increased while all other conditions are kept constant, the required rolling force

Options :

1. ✖ decreases due to smaller contact length

2. ✔ Increases because deformation zone and strain work increase

3. ✖ Remains constant

4. ✖ Becomes zero at large reductions

Question Number : 23 Question Id : 7520767223 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The compressor of a gas turbine plant, operating on an ideal intercooled Brayton cycle, accomplishes an overall pressure ratio of 6 in a two-stage compression process. Intercooling is used to cool the air coming out from the first stage to the inlet temperature of the first stage, before its entry to the second stage. Air enters the compressor at 300 K and 100 kPa. If the properties of gas are constant, the intercooling pressure for minimum compressor work is _____

Options :

1. ✖ 321.15 kPa

2. ✖ 479.16 kPa

3. ✔ 244.95 kPa

4. ✖ 195.35 kPa

Question Number : 24 Question Id : 7520767224 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In forced convection inside a pipe, the Nusselt number for fully developed laminar flow with constant wall temperature is:

Options :

1. ✔ 3.66

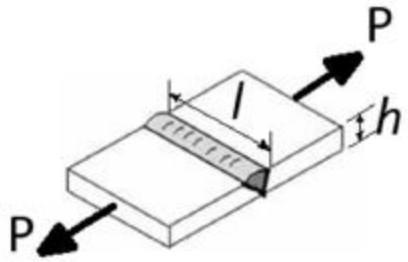
2. ✖ 4.36

3. ✖ 5.66

4. ✖ 6.36

Question Number : 25 Question Id : 7520767225 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The two plates are welded by a butt joint and is subjected to tensile force P as shown in figure. The average tensile stress in the weld is



Options :

1. ✖ $\sigma_t = {}^{2P}/_{hl}$

2. ✖ $\sigma_t = {}^{P}/_{2hl}$

3. ✔ $\sigma_t = {}^{P}/_{hl}$

4. ✖ $\sigma_t = {}^{2P}/_{3hl}$

Question Number : 26 Question Id : 7520767226 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which theory is commonly used to predict the failure of ductile materials under multiaxial stress states?

Options :

1. ✖ Coulomb's theory

2. ✖ Rankine's theory

3. ✔ Maximum distortion energy theory

4. ✖ Tresca's theory

Question Number : 27 Question Id : 7520767227 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a Carnot cycle, which process occurs between the two isothermal processes?

Options :

1. ✖ Isobaric processes

2. ✖ Isochoric processes

3. ✔ Adiabatic processes

4. ✖ Isenthalpic processes

Question Number : 28 Question Id : 7520767228 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The virtual work done by external active forces on an ideal mechanical system in equilibrium is ____ for any and all virtual displacements consistent with the constraints.

Options :

1. ✔ Zero

2. ✖ Unit

3. ✖ Twice

4. ✖ Thrice

Question Number : 29 Question Id : 7520767229 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

One kg of air, initially at a temperature of 127 °C expands reversibly at a constant pressure until the volume is doubled. If the gas constant of air is 287J/kg K, the magnitude of work transfer is _____ kJ.

Options :

1. ✖ 168.12

2. ✖ 203.48

3. ✖ 196.56

4. ✔ 114.8

Question Number : 30 Question Id : 7520767230 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A cylindrical vessel is said to be thin if the ratio of its internal diameter to the wall thickness is

Options :

1. ✖ Less than 20

2. ✖ Equal to 20

3. ✔ More than 20

4. ✖ Equal to 25

Question Number : 31 Question Id : 7520767231 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If the coefficient of friction between brake lining and drum decreases, the braking effort required

Options :

1. ✔ Increases

2. ✖ Decreases

3. ✖ Remains constant

4. ✖ Becomes zero

Question Number : 32 Question Id : 7520767232 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A surface behaves as a perfect black body at 600 K. Another black body is at 300 K. The ratio of emissive powers is:

Options :

1. ✖ 2

2. ✖ 4

3. ✖ 8

4. ✔ 16

Question Number : 33 Question Id : 7520767233 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A cylinder contains 5 m^3 of an ideal gas at a pressure of 1 bar. The gas is compressed in a reversible isothermal process until the pressure increases to 5 bar. Determine the work required for this compression (kJ).

Options :

1. ✔ 804.7

2. ✖ 953.2

3. ✖ 981.7

4. ✖ 1012.2

Question Number : 34 Question Id : 7520767234 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A strip of 200 mm wide and 10 mm thick is reduced to 8 mm in one pass. Roll diameter = 100 mm, average flow stress = 200 MPa. Rolling load is:

Options :

1. ✔ 0.4 MN

2. ✖ 0.8 MN

3. ✖ 1.2 MN

4. ✖ 1.6 MN

Question Number : 35 Question Id : 7520767235 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which forecasting method is most appropriate when the data exhibits trend but no seasonality?

Options :

1. ✖ Simple moving average

2. ✖ Naive forecasting

3. ✔ Double exponential smoothing

4. ✖ Seasonal index method

Question Number : 36 Question Id : 7520767236 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Virtual work method is particularly useful for analysing

Options :

1. ✖ Determinate structures

2. ✔ Indeterminate structures

3. ✖ Simple beams

4. ✖ Particles

Question Number : 37 Question Id : 7520767237 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Air (ideal gas) enters a perfect insulated compressor of a temperature of 310 K. The pressure ratio of compressor is 6, Specific heat at constant pressure for air 1005 J/kgK and ratio of specific heats at constant pressure and constant volume is 1.4. Assume that specific heat of air is constant. If the isentropic efficiency of the compressor is 85 percent, the difference in enthalpies of air between the exit and inlet of the compressor is _____

Options :

1. ✖ 148.2 kJ/kg

2. ✔ 245.2 kJ/kg

3. ✖ 238.2 kJ/kg

4. ✖ 198.3 kJ/kg

Question Number : 38 Question Id : 7520767238 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the primary cause of buoyant force acting on a submerged object?

Options :

1. ✖ The object's weight

2. ✔ The pressure difference between the top and bottom of the object

3. ✖ The viscosity of the fluid

4. ✖ The surface tension of the fluid

Question Number : 39 Question Id : 7520767239 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The Reynolds number for flow of oil through a 1 cm diameter pipe is 1000. The kinematic viscosity, $v = 1.0 \times 10^{-6}$ m^2/s. What is the velocity at a point 0.25 cm away from the wall?

Options :

1. ✖ 0.1 m/s

2. ✔ 0.15 m/s

3. ✖ 0.2 m/s

4. ✖ 0.3 m/s

Question Number : 40 Question Id : 7520767240 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Two beams of equal cross sectional areas are subjected to equal bending moment. If one beam has square cross section and the other has circular section, then

Options :

1. ✖ Both beams will be equally stronger

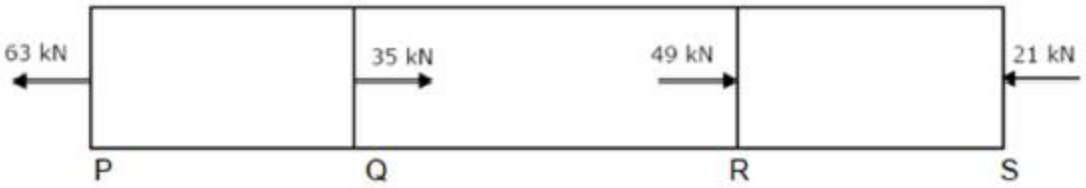
2. ✖ Circular section beam will be stronger

3. ✔ Square section beam will be stronger

4. ✖ Cannot comment

Question Number : 41 Question Id : 7520767241 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A bar having a cross sectional area of 700 mm^2 is subjected to axial loads at the positions indicated in figure. Find the value of stress in the segment QR?



Options :

1. ✖ 60 Mpa

2. ✖ 70 Mpa

3. ✖ 120 Mpa

4. ✔ 40 Mpa

Question Number : 42 Question Id : 7520767242 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A solid sphere has characteristic length $L_c = 0.02$ m, thermal conductivity K = 40 W/mK, and convective heat transfer coefficient h = 10 W/m^{2}K. Find the correct statement.

Options :

1. ✔ Lumped system valid

2. ✖ Lumped system not valid

3. ✖ Boundary layer negligible

4. ✖ Steady state condition

Question Number : 43 Question Id : 7520767243 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the main difference between PERT and CPM?

Options :

1. ✖ PERT uses deterministic activity times; CPM uses probabilistic times

2. ✔ CPM uses deterministic activity times; PERT uses probabilistic times

3. ✖ PERT uses deterministic activity times; CPM uses deterministic activity times

4. ✖ CPM uses probabilistic times; PERT uses probabilistic times

Question Number : 44 Question Id : 7520767244 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Match the processes with their characteristics

Process		Characteristics	
P	Electrical Discharge Machining	1	No residual stress
Q	Ultrasonic machining	2	Machining of electrically conductive materials
R	Chemical machining	3	Machining of glass
S	Ion Bean Machining	4	Nanomachining

Options :

1. ✔ P-2, Q-3, R-1, S-4

2. ✖ P-3, Q-2, R-1, S-4

3. ✖ P-3, Q-2, R-4, S-1

4. ✖ P-2, Q-4, R-3, S-1

Question Number : 45 Question Id : 7520767245 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For a closed, simple compressible system, which of the following thermodynamic relations is always valid, irrespective of the process, assuming only reversible processes and equilibrium states?

Options :

1. ✖ $\left(\frac{\partial U}{\partial V}\right)_T = T\left(\frac{\partial P}{\partial T}\right)_V - P$

2. ✖ $\left(\frac{\partial H}{\partial P}\right)_T = -T\left(\frac{\partial V}{\partial T}\right)_P - V$

3. ✔ $\left(\frac{\partial S}{\partial P}\right)_T = -\left(\frac{\partial V}{\partial T}\right)_P$

4. ✖ $\left(\frac{\partial S}{\partial P}\right)_T = -\left(\frac{\partial V}{\partial T}\right)_P - P$

Question Number : 46 Question Id : 7520767246 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a probabilistic inventory model, which distribution is commonly used to model demand?

Options :

1. ✖ Uniform distribution

2. ✔ Normal distribution

3. ✖ Exponential distribution

4. ✖ Binomial distribution

Question Number : 47 Question Id : 7520767247 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The logarithmic mean temperature difference (LMTD) method is used to:

Options :

1. ✖ Calculate heat exchanger effectiveness

2. ✖ Determine heat exchanger pressure drop

3. ✔ Calculate the average temperature difference during heat transfer

4. ✖ Find the overall heat transfer coefficient

Question Number : 48 Question Id : 7520767248 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A mould cavity of 1200 cm^3 volume has to be filled through a sprue of 10 cm length feeding a horizontal runner. Corss-sectional area at the base of the sprue is 2 cm^2. Consider acceleration due to gravity as 9.81 m/s^2. Neglecting frictional losses due to molten metal flow, the time taken to fill the mould cavity is

Options :

1. ✔ 4.28 s

2. ✖ 5.26 s

3. ✖ 7.23 s

4. ✖ 5.36 s

Question Number : 49 Question Id : 7520767249 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The Reynolds number is a ratio of:

Options :

1. ✔ Inertial forces to viscous forces

2. ✖ Gravitational forces to inertial forces

3. ✖ Viscous forces to pressure forces

4. ✖ Surface tension forces to inertial forces

Question Number : 50 Question Id : 7520767250 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the name of the surface that is generated with linear interpolation of two curves?

Options :

1. ✖ Bezier surface

2. ✖ B-spline surface

3. ✖ Planar surface

4. ✔ Ruled surface

Question Number : 51 Question Id : 7520767251 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The emissivity of a grey surface is:

Options :

1. ✖ Equal to 1

2. ✔ Less than 1 and independent of wavelength

3. ✖ Greater than 1

4. ✖ Equal to the absorptivity at all wavelengths

Question Number : 52 Question Id : 7520767252 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Two shafts A and B are made up of the same material. The diameter of the shaft A is twice as that of shaft B. The power transmitted by the shaft A will be 'X' times of shaft B. What is the value of 'X'?

Options :

1. ✖ 2

2. ✖ 4

3. ✔ 8

4. ✖ 16

Question Number : 53 Question Id : 7520767253 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Maximum velocity in laminar flow in a pipe is

Options :

1. ✖ Equal to the average velocity

2. ✔ Twice the average velocity

3. ✖ Half the average velocity

4. ✖ Four times the average velocity

Question Number : 54 Question Id : 7520767254 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A cantilever beam of rectangular cross section is subjected to a load W at its free end. If the depth of the beam is doubled and the load is halved, the deflection of the free end as compared to original deflection will be _____.

Options :

1. ✖ 1/2

2. ✖ 1/8

3. ✔ 1/16

4. ✖ 2.0

Question Number : 55 Question Id : 7520767255 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the significance of availability (or exergy) in thermodynamics?

Options :

1. ✖ It measures the total energy content of a system.

2. ✔ It quantifies the maximum useful work obtainable from a system.

3. ✖ It is the heat lost during a process.

4. ✖ It represents the entropy generated in a process.

Question Number : 56 Question Id : 7520767256 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A hole of $25H_7$ is to be checked. IT7 tolerance = 0.021 mm. Hole limits are:

Options :

1. ✔ 25.000 – 25.021 mm

2. ✖ 24.979 – 25.000 mm

3. ✖ 25.021 – 25.042 mm

4. ✖ 24.979 – 25.021 mm

Question Number : 57 Question Id : 7520767257 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A 50 mm diameter disc is to be punched out from a carbon steel sheet 1.0 mm thick. The diameter of the punch should be

Options :

1. ✖ 49.925 mm

2. ✔ 50.00 mm

3. ✖ 50.075 mm

4. ✖ 49.754 mm

Question Number : 58 Question Id : 7520767258 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In the Basic Economic Order Quantity (EOQ) model, if the holding cost per unit increases, the EOQ will:

Options :

1. ✖ Increase

2. ✔ Decrease

3. ✖ Remain unaffected

4. ✖ Double

Question Number : 59 Question Id : 7520767259 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which aggregate production planning strategy focuses on maintaining a stable workforce and using inventory to absorb demand fluctuations?

Options :

1. ✖ Chase strategy

2. ✔ Level strategy

3. ✖ Hybrid strategy

4. ✖ Just-in-time strategy

Question Number : 60 Question Id : 7520767260 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A rod of steel of 1 cm^2 in cross-sectional area and 100 cm long is subjected to an axial pull of 20000N. If $E = 20 \times 10^6$ N/cm^2, the elongation will be

Options :

1. ✖ 1 cm

2. ✖ 0.2 cm

3. ✔ 0.1 cm

4. ✖ 0.15 cm

Question Number : 61 Question Id : 7520767261 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The relative humidity of ambient air at 300 K is 50% with a partial pressure of water vapour equal to P_v. The saturation pressure of water at 300 K is p_{sat}. The correct relation for the air-water mixture is

Options :

1. ✖ $P_v = p_{sat}$

2. ✖ $P_v = 0.622\ p_{sat}$

3. ✔ $P_v = 0.5\ p_{sat}$

4. ✖ $P_v = 2\ p_{sat}$

Question Number : 62 Question Id : 7520767262 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Fatigue failure occurs due to

Options :

1. ✖ Single static load

2. ✔ Repeated or fluctuating stresses

3. ✖ High temperature

4. ✖ Creep deformation

Question Number : 63 Question Id : 7520767263 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If a heat exchanger has effectiveness = 1, it means:

Options :

1. ✖ No heat transfer

2. ✔ Maximum possible heat transfer occurs

3. ✖ Temperature difference becomes zero

4. ✖ Both fluids exit at same temperature

Question Number : 64 Question Id : 7520767264 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

During heat treatment of steel, the hardness of various structures in increasing order is

Options :

1. ✖ martensite, fine pearlite, coarse pearlite, spherodite

2. ✖ fine pearlite, coarse pearlite, spherodite, martensite

3. ✖ martensite, coarse pearlite, fine pearlite, spherodite

4. ✔ spherodite, coarse pearlite, fine pearlite, martensite

Question Number : 65 Question Id : 7520767265 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a project network, two parallel activities start from the same node and merge at the same succeeding node. Their durations are:

- Activity A = 6 days
- Activity B = 9 days

Which statement is correct?

Options :

1. ✖ Both activities lie on the critical path

2. ✖ Only Activity A lies on the critical path

3. ✔ Only Activity B lies on the critical path

4. ✖ Neither activity lies on the critical path

Question Number : 66 Question Id : 7520767266 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Water (Cp = 4.18 kJ/kg·K) at 80°C enters a counter-flow heat exchanger with a mass flow rate of 0.5 kg/s. Air (Cp = 1 kJ/kg·K) enters at 30°C with a mass flow rate of 2.09 kg/s. If the effectiveness of the heat exchanger is 0.8, the LMTD (°C) is

Options :

1. ✖ 40

2. ✖ 20

3. ✔ 10

4. ✖ 5

Question Number : 67 Question Id : 7520767267 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The continuity equation for an incompressible fluid states that:

Options :

1. ✖ The velocity is constant everywhere

2. ✔ The volume flow rate is constant along a streamline

3. ✖ The pressure is constant along a streamline

4. ✖ The density changes with velocity

Question Number : 68 Question Id : 7520767268 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

The Number of Transfer Units (NTU) method is primarily used to:

Options :

1. ✔ Design heat exchangers based on effectiveness

2. ✖ Calculate pressure drop in pipes

3. ✖ Determine fluid velocity in convection

4. ✖ Analyze radiation heat transfer

Question Number : 69 Question Id : 7520767269 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider a simple gas turbine (Brayton) cycle and a gas turbine with perfect regeneration. In both the cycles, the pressure ratio is 6 and the ratio of the specific heats of the working medium is 1.4. The ratio of minimum to maximum temperatures is 0.3 (with temperatures expressed in K) in the regenerative cycle. The ratio of the thermal efficiency of the simple cycle to that of the regenerative cycle is

Options :

1. ✖ 0.1859

2. ✔ 0.8141

3. ✖ 0.6256

4. ✖ 0.3744

Question Number : 70 Question Id : 7520767270 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a clock mechanism, hour and minute hands are connected by _____ gear train.

Options :

1. ✖ Simple

2. ✖ Epicyclic

3. ✖ Compound

4. ✔ Reverted

Question Number : 71 Question Id : 7520767271 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

Which of the following processes is isobaric?

Options :

1. ✔ Expansion of gas at constant pressure.

2. ✖ Compression of gas at constant volume.

3. ✖ Heating of gas with no change in temperature.

4. ✖ Expansion of gas with no heat exchange.

Question Number : 72 Question Id : 7520767272 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the primary reason for using a key in shaft and gear assemblies?

Options :

1. ✖ To reduce friction between shaft and gear

2. ✔ To transmit torque without relative rotation

3. ✖ To allow axial movement of the gear

4. ✖ To increase the shaft diameter

Question Number : 73 Question Id : 7520767273 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Heat transfer of 800 kJ occurs from a source at 500 K to surroundings at 300 K. Calculate maximum available work.

Options :

1. ✔ 320 KJ

2. ✖ 280 KJ

3. ✖ 420 KJ

4. ✖ 340 KJ

Question Number : 74 Question Id : 7520767274 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the significance of the "instantaneous center of zero velocity" in mechanism analysis?

Options :

1. ✖ It is the point where velocity is maximum

2. ✔ It is the point about which a link is instantaneously rotating

3. ✖ It is the point where acceleration is zero

4. ✖ It is the point where torque is applied

Question Number : 75 Question Id : 7520767275 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A shaft is required to transmit a power of 25 kW at 360 rpm. The force analysis due to attached parts results in Bending Moment of 830 Nm at a section between bearings. If permissible stresses in the shaft are 60 N/mm^2 in bending and 40 N/mm^2 in shear, calculate the diameter of the shaft.

Options :

1. ✔ 51 mm

2. ✖ 41 mm

3. ✖ 36 mm

4. ✖ 60 mm

Question Number : 76 Question Id : 7520767276 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In the entrance region of a pipe, the boundary layer grows and the inviscid core accelerates. This is accompanied by the fluid's pressure drop per unit length is

Options :

1. ✖ lower compared to the fully developed region

2. ✖ same compared to the fully developed region

3. ✖ Lower or same compared to the fully developed region

4. ✔ higher compared to the fully developed region

Question Number : 77 Question Id : 7520767277 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the main difference between annealing and tempering?

Options :

1. ✖ Annealing increases hardness, while tempering decreases hardness

2. ✖ Tempering produces martensite while annealing produces pearlite

3. ✔ Annealing softens the metal, tempering reduces brittleness after quenching

4. ✖ Annealing is a rapid cooling process; tempering is slow cooling

Question Number : 78 Question Id : 7520767278 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Air enters an adiabatic nozzle at 300 kPa and 500 K with a velocity of 10 m/s. It leaves the nozzle at 100 kPa with a velocity of 180 m/s. The specific heat of air Cp = 1008 J/kg·K. The exit temperature of air is

Options :

1. ✖ 516 K

2. ✖ 532 K

3. ✔ 484 K

4. ✖ 468 K

Question Number : 79 Question Id : 7520767279 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which comparator type uses a dial indicator to measure deviations from a standard?

Options :

1. ✖ Optical comparator

2. ✔ Mechanical comparator

3. ✖ Electronic comparator

4. ✖ Pneumatic comparator

Question Number : 80 Question Id : 7520767280 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a counter flow heat exchanger, hot fluid enters at 120°C and leaves at 80°C. Cold fluid enters at 20°C and leaves at 60°C. Find the log mean temperature difference (LMTD).

Options :

1. ✖ 30°C

2. ✖ 40°C

3. ✔ 60°C

4. ✖ 80°C

Question Number : 81 Question Id : 7520767281 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For an ideal Rankine cycle operating between pressure of 30 bar and 0.04 bar the work output from the turbine is 903kJ/kg and the work input to the feed pump is 3kJ/kg. The specific steam consumption is _____ kg/kWh

Options :

1. ✖ 2

2. ✔ 4

3. ✖ 6

4. ✖ 8

Question Number : 82 Question Id : 7520767282 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The device used to demonstrate laminar and turbulent flow in pipes is:

Options :

1. ✖ Pitot tube

2. ✖ Venturimeter

3. ✔ Reynolds apparatus

4. ✖ Orifice meter

Question Number : 83 Question Id : 7520767283 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is a key assumption in linear programming?

Options :

1. ✖ The relationship between variables is nonlinear

2. ✖ Variables can only take integer values

3. ✔ The objective function and constraints are linear

4. ✖ There are no constraints on variables

Question Number : 84 Question Id : 7520767284 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The number of atoms per unit cell and the number of slip system, respectively, for a face-centered cubic (FCC) crystal are

Options :

1. ✔ 4, 12

2. ✖ 3, 12

3. ✖ 3, 3

4. ✖ 4, 48

Question Number : 85 Question Id : 7520767285 Question Type : MCQ

Correct Marks : 1 Wrong Marks : 0

A closed system undergoes a process in which it interacts with the surroundings maintained at $T_0 = 300$ K and $P_0 = 100$ kPa. During the process:

- The system receives 1000 kJ of heat from a reservoir at 1200 K.
- The system does 500 kJ of boundary work on the surroundings.
- There is no change in kinetic or potential energy, and the process ends at the dead state (equilibrium with surroundings).

Which of the following statements is most correct?

Options :

1. ✖ The maximum useful work (availability) from the given heat input is 750 kJ, and the irreversibility is 750 kJ.

2. ✖ The maximum useful work (availability) from the given heat input is 500 kJ, and the irreversibility is 250 kJ.

3. ✖ The maximum useful work (availability) from the given heat input is 750 kJ, and the irreversibility is 500 kJ.

The maximum useful work (availability) from the given heat input is 750 kJ, and the irreversibility is 250 kJ.

4. ✔

Question Number : 86 Question Id : 7520767286 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Computer Integrated Manufacturing (CIM) primarily refers to

Options :

1. ✖ Using computers only in design

2. ✔ Integration of manufacturing activities through computer systems

3. ✖ Manual control of manufacturing operations

4. ✖ Replacement of machines by computers

Question Number : 87 Question Id : 7520767287 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

For an air-standard Otto cycle, the compression ratio is 8 and the ratio of specific heats (γ) is 1.4. The air-standard efficiency of the cycle is _____.

Options :

1. ✔ 56.5

2. ✖ 62.8

3. ✖ 35.8

4. ✖ 49.8

Question Number : 88 Question Id : 7520767288 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider a large cubic ice block floating in water with top surface of the ice block parallel to the surface of the sea. The specific gravities of ice and seawater are 0.9 and 1.0, respectively. If a 20-cm-high portion of the ice block extends above the surface of the water, determine the height of the ice block below the surface.

Options :

1. ✖ 0.9 m

2. ✖ 1.0 m

3. ✖ 1.6 m

4. ✔ 1.8 m

Question Number : 89 Question Id : 7520767289 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is NOT a primary mechanism of material removal in Electrical Discharge Machining (EDM)

Options :

1. ✖ Thermal melting and vaporization by spark energy

2. ✔ Electrochemical dissolution in the dielectric

3. ✖ Re-solidification and flushing of molten droplets

4. ✖ No direct mechanical contact

Question Number : 90 Question Id : 7520767290 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In turbulent flow through a pipe, the Reynolds number is typically:

Options :

1. ✖ Less than 2000

2. ✖ Between 2000 and 4000

3. ✔ Greater than 4000

4. ✖ Exactly 2300

Question Number : 91 Question Id : 7520767291 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A liquid of specific gravity 1.0 flows in a pipe at a rate of 900 lit/s, from point 1 to point 2 which is 1 m above point 1. The areas at section 1 and 2 are 0.6 m^2 and 0.3 m^2 respectively. If the pressure at section 1 is 20 kPa, determine the pressure at section 2. (Assume g = 10 m/s^2)

Options :

1. ✔ 6.625 kPa

2. ✖ 3.3125 kPa

3. ✖ 13.25 kPa

4. ✖ 16.625 kPa

Question Number : 92 Question Id : 7520767292 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In the case of bi-axial state of normal stresses, the normal stress on 45° plane is equal to _____.

Options :

1. ✖ the sum of the normal stresses

2. ✖ the difference of normal stresses

3. ✔ half the sum of the normal stresses

4. ✖ half the difference of normal stresses

Question Number : 93 Question Id : 7520767293 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In Mohr's circle for plane stress, what do the points on the circle represent?

Options :

1. ✔ Principal stresses and their directions

2. ✖ Shear stresses only

3. ✖ Normal stresses only

4. ✖ Strain energy values

Question Number : 94 Question Id : 7520767294 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which type of bearing is best suited for high-speed applications with moderate radial loads?

Options :

1. ✖ Plain (sliding) bearing

2. ✔ Ball bearing

3. ✖ Roller bearing

4. ✖ Thrust bearing

Question Number : 95 Question Id : 7520767295 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A viscous damping system with free vibrations is said to be critically damped if the damping factor is

Options :

1. ✖ Less than one

2. ✖ More than one

3. ✔ One

4. ✖ Zero

Question Number : 96 Question Id : 7520767296 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

During an adiabatic process in an ideal gas, which of the following is true?

Options :

1. ✖ Heat is transferred to the system.

2. ✖ Temperature remains constant.

3. ✔ No heat is transferred to or from the system.

4. ✖ Pressure remains constant.

Question Number : 97 Question Id : 7520767297 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A mould has a down sprue whose length is 20 cm and the cross-sectional area at the base of the down sprue is 1 cm^2. The down sprue feeds a horizontal runner leading into the mould cavity of volume 1000 cm^3. The time required to fill the mould cavity will be

Options :

1. ✖ 4.05 s

2. ✔ 5.05 s

3. ✖ 6.05 s

4. ✖ 7.25 s

Question Number : 98 Question Id : 7520767298 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The thermal stress in terms of modules of elasticity(E), co-efficient of thermal expansion(α), Temperature(T) is given by

Options :

1. ✔ $E\alpha T$

2. ✖ ET / α

3. ✖ $E\alpha / T$

4. ✖ $1 / E\alpha T$

Question Number : 99 Question Id : 7520767299 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In bulk metal forming, the load required for forging depends primarily on:

Options :

1. ✖ Surface finish of the workpiece

2. ✔ Flow stress and deformation volume

3. ✖ Ambient temperature only

4. ✖ Type of lubricant used

Question Number : 100 Question Id : 7520767300 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the main goal of the assignment problem?

Options :

1. ✔ To minimize the total cost of assigning tasks to agents

2. ✖ To maximize the flow in a network

3. ✖ To schedule project activities

4. ✖ To determine the shortest route for transportation

Question Number : 101 Question Id : 7520767301 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A thin cylindrical shell of diameter 'd', length 'l' and thickness 't' is subjected to an internal pressure 'P'. What is the ratio of longitudinal strain to hoop strain in terms of Poisson's ratio (1/m)

Options :

1. ✖ (m-2) / (2m+1)

2. ✖ (2m-1) / (m-2)

3. ✔ (m-2) / (2m-1)

4. ✖ (2m+1) / (m-2)

Question Number : 102 Question Id : 7520767302 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The bending moment on a section is maximum where shearing force is ____

Options :

1. ✖ One

2. ✖ Maximum

3. ✖ Minimum

4. ✔ Changing sign

Question Number : 103 Question Id : 7520767303 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The shape factor in radiative heat transfer depends on:

Options :

1. ✖ Surface temperatures only

2. ✖ Surface emissivities only

3. ✔ Geometry and relative orientation of surfaces

4. ✖ Thermal conductivity of surfaces

Question Number : 104 Question Id : 7520767304 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a DC arc welding operation, the voltage-arc length characteristic was obtained as $V_{arc} = 20 + 5L$, where the arc length L was varied between 5 mm and 7mm. Here V_{arc} denotes the arc voltage in volts. The arc current was varied from 400 A to 500 A. Assuming linear power source characteristics, the open circuit voltage and short circuit current for the welding operation are:

Options :

1. ✖ 45 V, 450 A

2. ✖ 75 V, 550 A

3. ✔ 95 V, 950 A

4. ✖ 150 V, 1500 A

Question Number : 105 Question Id : 7520767305 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Which of the following is a critical design consideration for gating systems in casting?

Options :

1. ✔ Minimizing turbulence of molten metal flow

2. ✖ Maximizing mould weight

3. ✖ Increasing solidification time

4. ✖ Reducing mould permeability

Question Number : 106 Question Id : 7520767306 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

In a reversed Brayton refrigeration cycle, the refrigerating effect is increased if

Options :

1. ✖ pressure ratio increases

2. ✔ pressure ratio decreases

3. ✖ compressor efficiency decreases

4. ✖ turbine efficiency decreases

Question Number : 107 Question Id : 7520767307 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

What is the effect of increasing the rake angle of a cutting tool?

Options :

1. ✖ Increases cutting forces

2. ✔ Reduces cutting forces and improves chip flow

3. ✖ Increases tool wear

4. ✖ Decreases tool life drastically

Question Number : 108 Question Id : 7520767308 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A heat engine operates between a hot source at $T_H = 900$ K and a cold sink at the ambient temperature $T_0 = T_C = 300$ K. During one cycle the engine receives $Q_H = 12{,}000$ kJ from the hot source and rejects $Q_C = 8{,}000$ kJ to the cold sink. Which of the following statements is correct?

Options :

1. ✖ The entropy generation per cycle is Sgen = 4.00 kJ/K.

The process is reversible because the work equals the Carnot work for these temperatures.

2. ✖

The entropy generation per cycle is Sgen = 13.333 kJ/K

3. ✔

The entropy generation is zero.

4. ✖

Question Number : 109 Question Id : 7520767309 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The relationship between modulus of elasticity(E), Poisson's ratio(μ) and bulk modulus(K) is given by

Options :

1. ✔ $K = \frac{E}{3(1-2\mu)}$

2. ✖ $K = \frac{E}{3(1+2\mu)}$

3. ✖ $G = \frac{E}{2(1+\mu)}$

4. ✖ $G = \frac{E}{2(1-\mu)}$

Question Number : 110 Question Id : 7520767310 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A slot of 25 mm × 25 mm is to be milled in a workpiece of 300 mm length using a side and face milling cutter of diameter 100 mm, width 25 mm, and having 20 teeth. For a depth of cut of 5 mm, feed per tooth 0.1 mm, cutting speed 35 m/min, and approach distance and over-travel distance of 5 mm each, determine the time required for milling the slot.

Options :

1. ✖ 8.07 s

2. ✔ 8.07 min

3. ✖ 9.02 min

4. ✖ 9.02 s

Question Number : 111 Question Id : 7520767311 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Let $A = \begin{pmatrix} 2026 & 2025 & 2024 \\ 2025 & 2024 & 2023 \\ 2024 & 2023 & 2023 \end{pmatrix}$ be a matrix. Then, $\det(A)$ is equal to _____

Options :

1. ✔ -1

2. ✖ 0

3. ✖ 1

4. ✖ -4051

Question Number : 112 Question Id : 7520767312 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If a 2×2 matrix A has eigenvalues 1 and 4 with the corresponding eigenvectors $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$ and $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$, respectively, then A is _____

Options :

1. ✖ $\begin{pmatrix} -4 & -8 \\ 5 & 9 \end{pmatrix}$

2. ✖ $\begin{pmatrix} 9 & -8 \\ 5 & -4 \end{pmatrix}$

3. ✖ $\begin{pmatrix} 2 & 2 \\ 1 & 3 \end{pmatrix}$

4. ✔ $\begin{pmatrix} 3 & 2 \\ 1 & 2 \end{pmatrix}$

Question Number : 113 Question Id : 7520767313 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider the statements.

I. if $s_n = \frac{1}{n}$, the sequence $\{s_n\}$ is divergent.

II. if $s_n = 1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n}$, the sequence $\{s_n\}$ is convergent.

Which one of the following is correct?

Options :

1. ✖ Both I and II are true

2. ✖ I is true, but II is false

3. ✖ I is false, but II is true

4. ✔ Neither I nor II is true

Question Number : 114 Question Id : 7520767314 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

Consider the statements.

I. If f is a differentiable scalar field, then $curl(grad\ f) = \vec{0}$.

II. If $\vec{f}$ is a differentiable vector field, then $div(curl\ \vec{f}\ ) = 0$.

Which one of the following is correct?

Options :

1. ✖ I is true, but II is false

2. ✖ I is false, but II is true

3. ✔ Both I and II are true

4. ✖ Neither I nor II is true

Question Number : 115 Question Id : 7520767315 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The solution of the differential equation $x\frac{d^2y}{dx^2}+\frac{dy}{dx}=0$ is

Options :

1. ✖ $y=c_1\sin x+c_2$

2. ✖ $y=c_1\cos x+c_2$

3. ✔ $y=c_1\log x+c_2$

4. ✖ $y=c_1e^{x}+c_2e^{-x}$

Question Number : 116 Question Id : 7520767316 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The absolute maximum of the function $f(x)=x^3-3x+2$ in the interval $[0,2]$ is

_____

Options :

1. ✖ 0

2. ✖ 2

3. ✔ 4

4. ✖ 6

Question Number : 117 Question Id : 7520767317 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The system of equation $x - y + 3z = 0, x + z = 0, x + y - z = 0$ has ___

Options :

1. ✖ a unique solution

2. ✖ finitely many solutions

3. ✔ infinitely many solutions

4. ✖ no solution

Question Number : 118 Question Id : 7520767318 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

If A, B and C are mutually exclusive and exhaustive events of a random experiment such that $P(A) = \frac{1}{3}P(B)$ and $P(B) = 2P(C)$, then $P(A \cup C)$ is equal to _____

Options :

1. ✖ $\frac{7}{11}$

2. ✖ $\frac{5}{13}$

3. ✖ $\frac{7}{13}$

4. ✔ $\frac{5}{11}$

Question Number : 119 Question Id : 7520767319 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

A continuous random variable X has a probability density function

$$f(x) = \begin{cases} 3x^2, & if\ 0 \le x \le 1 \\ 0, & \text{otherwise} \end{cases}$$

If $P(X \le a) = P(X > a)$, then the value of a is equal to _____

Options :

1. ✖ $\frac{1}{3^{\frac{1}{3}}}$

2. ✖ $\frac{1}{3^{\frac{1}{2}}}$

3. ✖ $\frac{1}{2^{\frac{1}{2}}}$

4. ✔ $\frac{1}{2^{\frac{1}{3}}}$

Question Number : 120 Question Id : 7520767320 Question Type : MCQ
Correct Marks : 1 Wrong Marks : 0

The values of a function $f(x)$ obtained for different values of x are given below

x	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
$f(x)$	0.9	2.0	1.5	1.8	0.4

Using Simpson's one-third rule, the value of $\int_0^1 f(x)\,dx$ is approximately equal to__

Options :

1. ✖ 1.4

2. ✖ 1.5

3. ✔ 1.6

4. ✖ 1.7