

Andhra Pradesh State Council of Higher Education

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Mechanical Engineering (ME)

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Mechanical Engineering (ME)

Section Id :	29996537
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	120
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Display Number Panel :	Yes
Group All Questions :	Yes
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Sub-Section Number :	1
Sub-Section Id :	29996537
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 2999654321 Question Type : MCQ Display Question Number : Yes Is
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

What are the eigen values of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$?

Options :

1. 2, -3, 6
2. 2, 3, -6
3. -2, -3, 6
4. -2, 3, 6

Question Number : 2 Question Id : 2999654322 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The local maximum value of the function $f(x, y) = 2xy - 3x^2 - 3y^2 - 4x - 4y + 6$ is _____.

Options :

1. 3
2. 5
3. 10
4. 12

Question Number : 3 Question Id : 2999654323 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If S is the surface of the ellipsoid $ax^2 + by^2 + cz^2 = 1$,

then $\int_S (a^2x^2 + b^2y^2 + c^2z^2)^{\frac{1}{2}} ds = ?$

Options :

1. $\frac{2\pi}{abc}$

2. $\frac{4\pi}{abc}$

3. $\frac{4\pi}{\sqrt{abc}}$

4. $\frac{2\pi}{\sqrt{abc}}$

Question Number : 4 Question Id : 2999654324 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If $x^2 y'' + 2xy = \frac{2 \ln x}{x}$ and $y(0) = 1$, then $y(e)$ is

Options :

1. $2e^{-1}$

2. $3e^{-2}$

3. $4e^2$

4. e^{-2}

Question Number : 5 Question Id : 2999654325 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The particular integral of $(D^2 + 5D + 6)y = e^x$ is

Options :

1. $\frac{e^x}{12}$

2. $\frac{e^x}{6}$

3. $\frac{e^x}{8}$

4. $12 e^x$

Question Number : 6 Question Id : 2999654326 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The value of $\int_C e^{1/z} dz$ where $C:|z|=1$, is _____.

Options :

1. 0

2. πi

3. $2\pi i$

4. $-\pi i$

Question Number : 7 Question Id : 2999654327 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

What is the standard deviation for the following data relating to marks obtained by 15 students?

12, 21, 21, 23, 27, 28, 30, 34, 37, 39, 39, 39, 40, 49, 54

Options :

1. 12.5

2. 10.9

3. 11.8

4. 13.2

Question Number : 8 Question Id : 2999654328 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A variable X has the probability distribution

x	-1	2	4
$P(X = x)$	1/6	1/4	7/12

Then $E(X + 1)^2$ is _____.

Options :

1. 101/6

2. 102/6

3. 103/6

4. 104/6

Question Number : 9 Question Id : 2999654329 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The solution $y(1.2)$ of the initial value problem

$$\frac{dy}{dx} = 2x + y^2, y(1) = 1, h = 0.2$$

using the 2nd order Runge-Kutta method is _____.

Options :

1. 1.736

2. 1.756

3. 1.796

4. 1.746

Question Number : 10 Question Id : 2999654330 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the value of $\int_0^2 f(x) dx$ by Trapezoidal rule from the given table.

x	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2
f(x)	2	2.5	3	3.5	4	4.5	5	5.5	6

Options :

1. 7
2. 9
3. 8
4. 10

Question Number : 11 Question Id : 2999654331 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A tension member of diameter d is designed with factor of safety of 3. If the load and the diameter are doubled, then factor of safety will be

Options :

1. Unchanged
2. Reduced to half
3. Doubled
4. Remain Same

Question Number : 12 Question Id : 2999654332 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Enlarging an existing circular hole with a rotating single point cutting tool is called

Options :

1. Boring
2. Drilling
3. Reaming
4. Internal turning

Question Number : 13 Question Id : 2999654333 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Bernoulli's law is applicable to following types of fluids

Options :

1. Compressible fluid
2. Rotational flow
3. Incompressible fluid
4. Incompressible, irrotational and steady flow

Question Number : 14 Question Id : 2999654334 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The yield strength of a steel shaft is twice its endurance limit, which of the following torque fluctuations, reports the most critical situation, according to Soderberg's criteria

Options :

1. $-T$ to T
2. $-\frac{T}{2}$ to T

3. 0 to T

4. $\frac{+T}{2}$ to T

Question Number : 15 Question Id : 2999654335 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A plane state of stress is given by: $\sigma_x = 120$ MPa, $\sigma_y = 40$ MPa and $\tau_{xy} = -30$ MPa.

The principal stresses are

Options :

1. 100 MPa and 50 MPa

2. 120 MPa and 30 MPa

3. 160 MPa and 20 MPa

4. 130 MPa and 30 MPa

Question Number : 16 Question Id : 2999654336 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The size of spur gear is specified by

Options :

1. Number of teeth

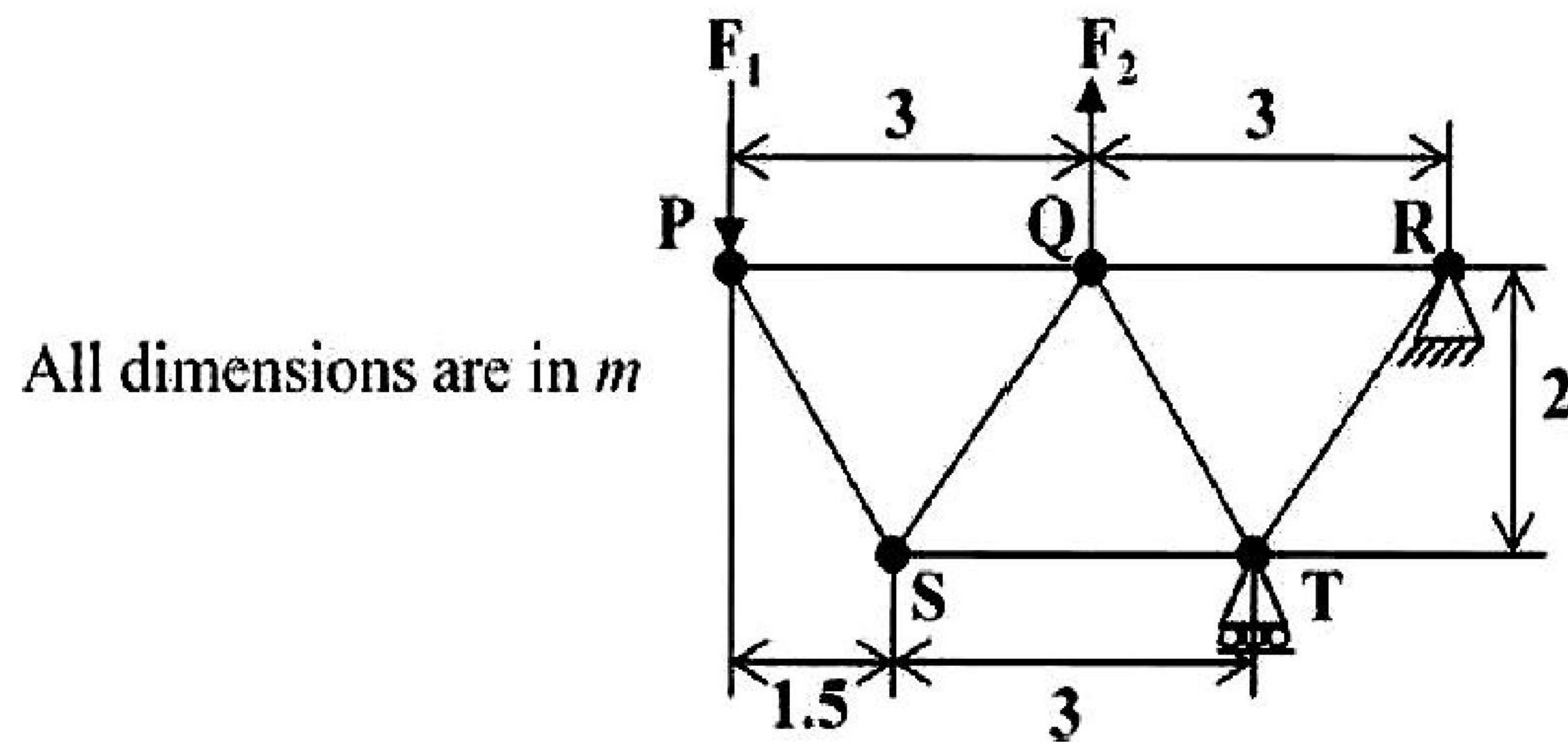
2. Module

3. Pitch circle diameter

4. Circular pitch

Question Number : 17 Question Id : 2999654337 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For the truss shown in the figure, the forces F_1 and F_2 are 9 kN and 3 kN, respectively. The force (in kN) in the member QS is



Options :

1. 11.25 tension
2. 11.25 compression
3. 13.5 tension
4. 13.5 compression

Question Number : 18 Question Id : 2999654338 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following failure theories is not used for elastic ductile material:

Options :

1. Von Mises theory
2. Tresca's theory
3. Distortion energy theory
4. Mohr-Coulomb theory

Question Number : 19 Question Id : 2999654339 Question Type : MCQ Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In terms of Poisson's ratio (μ) the ratio of the Young's modulus (E) to shear modulus (G) of elastic materials is

Options :

1. $2(1-\mu)$
2. $2(1+\mu)$
3. $\frac{1}{2}(1+\mu)$
4. $\frac{1}{2}(1-\mu)$

Question Number : 20 Question Id : 2999654340 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If, for a plane pin-jointed truss, $m = 2j - 3$ with the usual notation,

Options :

1. it must be a just-rigid truss
2. it cannot be over-rigid over any part of the truss
3. it may or may not be a just rigid truss
4. it cannot be non-rigid over any part of the truss

Question Number : 21 Question Id : 2999654341 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In relation to shear stress generated in springs, Wahl's factor (K) is denoted by ____.

Options :

1. $K = \frac{4C-1}{4C-4}$
2. $K = \frac{4C-4}{4C-1} + \frac{0.615}{C}$

3.
$$K = \frac{4C-1}{4C-4} + \frac{0.615}{C}$$

4.
$$K = 1 + \frac{0.5}{C}$$

Question Number : 22 Question Id : 2999654342 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Hot rolling of mild steel is carried out

Options :

1. at recrystallization temperature
2. between 100°C to 150°C
3. below recrystallization temperature
4. above recrystallization temperature

Question Number : 23 Question Id : 2999654343 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A small ball of mass 1 kg moving with a velocity of 12 m/s undergoes a direct central impact with a stationary ball of mass 2 kg. The impact is perfectly elastic.

The speed (in m/s) of 2 kg mass ball after the impact will be

Options :

1. 5
2. 6
3. 7
4. 8

Question Number : 24 Question Id : 2999654344 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Grinding wheel is considered soft or hard depending upon

Options :

1. Grain size
2. Strength of bond
3. Structure of wheel
4. Abrasive material

Question Number : 25 Question Id : 2999654345 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Beam supported at more than two places is known as

Options :

1. Uniform Beam
2. Continuous beam
3. Cantilever beam
4. Fixed beam

Question Number : 26 Question Id : 2999654346 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Linear vibration analysis has the greatest advantage because of

Options :

1. Newton's laws of motion
2. Eigenvalue analysis
3. Rayleigh quotient
4. Principle of superposition

Question Number : 27 Question Id : 2999654347 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A plane wall is 25 cm thick with an area of 1 m^2 , has a thermal conductivity of 0.5 W/m.K . If a temperature difference of 60°C is imposed across it. The heat flow across the wall is

Options :

1. 120 W
2. 140 W
3. 160 W
4. 180 W

Question Number : 28 Question Id : 2999654348 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For a system of co-planar parallel forces to be in equilibrium

Options :

1. The resultant force must vanish alone is sufficient
2. The resultant couple must vanish alone is sufficient
3. Both resultant force & resultant couple must vanish
4. Both resultant force & resultant couple must non zero value

Question Number : 29 Question Id : 2999654349 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A solid circular shaft of diameter ' d ' is subjected to a combined bending moment ' M ' and torque, ' T '. The material property to be used for designing the shaft using the relation $\frac{16}{\pi d} \sqrt{M^2 + T^2}$ is

Options :

1. ultimate tensile strength (S_u)
2. tensile yield strength (S_y)
3. torsional yield strength (S_{sy})
4. endurance strength (S_e)

Question Number : 30 Question Id : 2999654350 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Train value of a gear train is

Options :

1. equal to speed ratio of gear train
2. always less than unity
3. always greater than unity
4. equal to reciprocal of speed ratio of gear train

Question Number : 31 Question Id : 2999654351 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The assembly 40H7-d8 indicates that

Options :

1. basic hole is used
2. a basic shaft is used
3. 'd' stands for fundamental deviation of hole
4. 8 stands for grade of tolerance of shaft

Question Number : 32 Question Id : 2999654352 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

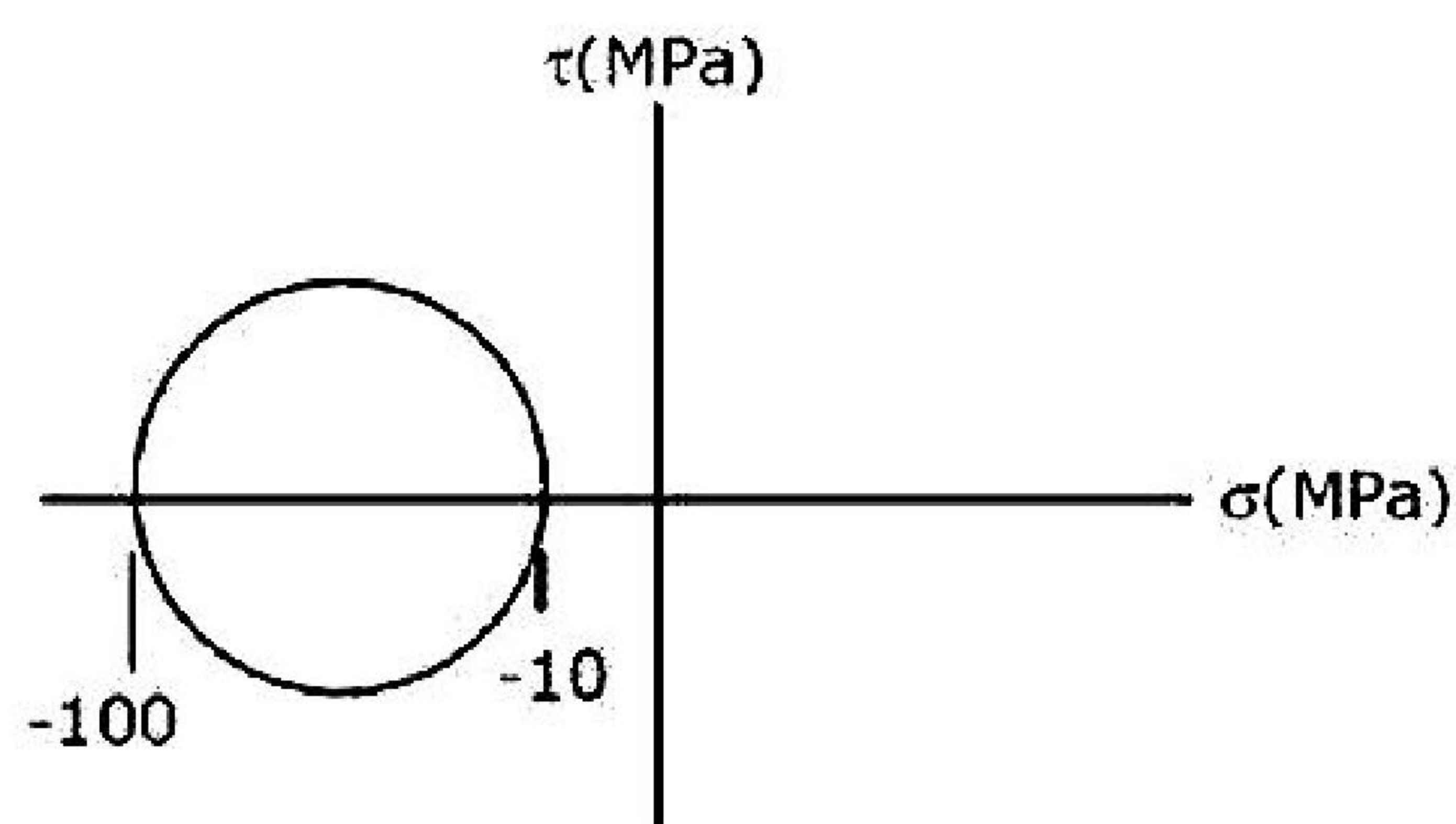
An engine works on the basis of Carnot cycle operating between temperature of 800 K and 400 K. If the heat supplied is 100 kW, the output is _____.

Options :

1. 50 kW
2. 60 kW
3. 70 kW
4. 80 kW

Question Number : 33 Question Id : 2999654353 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The Mohr's circle of plane stress for a point in a body is as shown in figure. The design is to be done on the basis of the maximum shear stress theory for yielding. Then, yielding will just begin if the designer chooses a ductile material whose yield strength is (in MPa)



Options :

1. 45
2. 50
3. 90

4. 100

Question Number : 34 Question Id : 2999654354 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

One black surface is at temperature 500 K. what is the wavelength at which emissive power is maximum? (in microns)

Options :

1. 4.8

2. 10.8

3. 5.8

4. 12.8

Question Number : 35 Question Id : 2999654355 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Delphi technique is used in

Options :

1. Quality control

2. Forecasting

3. Inventory management

4. Project management

Question Number : 36 Question Id : 2999654356 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following is NOT a decision taken during the aggregate production planning stage?

Options :

1. scheduling of machines
2. amount of labour to be committed
3. rate at which production should happen
4. Inventory to be carried forward

Question Number : 37 Question Id : 2999654357 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Shear force for a uniformly distributed load varies according to a straight line law whereas bending moment varies according to _____.

Options :

1. parabolic curve
2. hyperbola
3. semi-circle
4. straight line

Question Number : 38 Question Id : 2999654358 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If friction factor is 0.01, what is the equivalent length for an entrance loss of a pipe?
(where 'D' diameter of pipe)

Options :

1. 50 D
2. 0.02 D

3. 0.04 D

4. 25 D

Question Number : 39 Question Id : 2999654359 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Atomic packing factor is maximum for

Options :

1. Simple cubic structure

2. BCC structure

3. FCC structure

4. HCP structure

Question Number : 40 Question Id : 2999654360 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The part of a gating system which regulates the rate of pouring of molten metal is

Options :

1. runner

2. choke

3. Pouring basin

4. ingate

Question Number : 41 Question Id : 2999654361 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

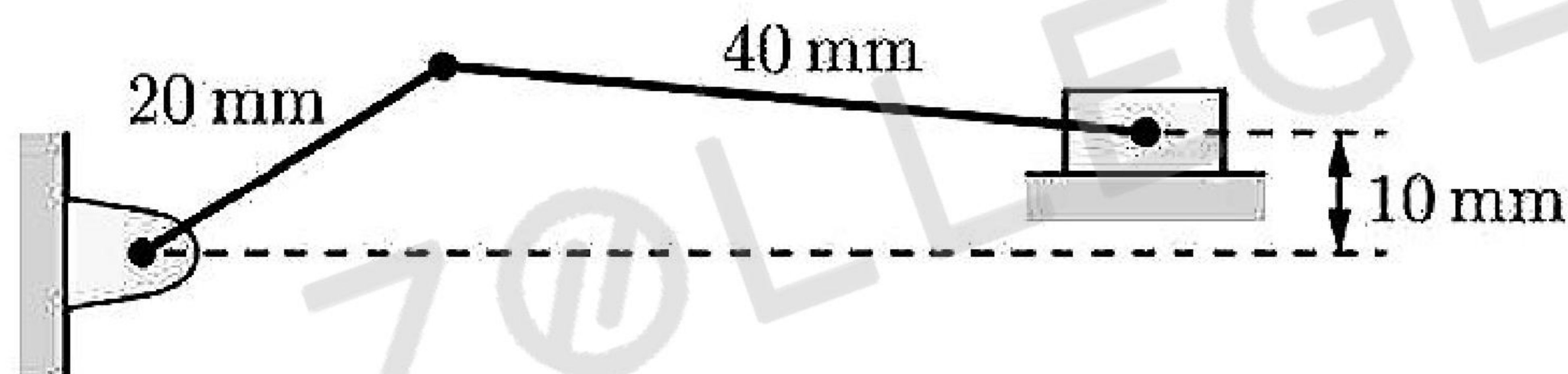
A solid shaft can resist a bending moment of 3 kN-m and a twisting moment of 4 kN-m together, then the maximum torque that can be applied is _____.

Options :

1. 7 kN-m
2. 3.5 kN-m
3. 4.5 kN-m
4. 5 kN-m

Question Number : 42 Question Id : 2999654362 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

An offset slider-crank mechanism is shown in the figure at an instant. Conventionally, the Quick Return Ratio (QRR) is considered to be greater than one. The value of QRR is



Options :

1. 1.25
2. 2.25
3. 3.50
4. 4.75

Question Number : 43 Question Id : 2999654363 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The maximum diameter that a capillary tube can have to ensure that the capillary rise of at least 6 mm is achieved when the tube is dipped in to a body of liquid with surface tension 0.08 N/m and density of 900 kg/m^3

Options :

1. 3 mm
2. 6 mm
3. 5 mm
4. 8 mm

Question Number : 44 Question Id : 2999654364 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

CAD and CAM are related through

Options :

1. NC tape programming and automated design
2. assembly automation and tool production
3. a common data base and communication system
4. parts production and testing

Question Number : 45 Question Id : 2999654365 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The engine oil at 150°C is cooled to 80°C in a parallel flow heat exchanger by water entering at 25°C and leaving at 60°C . What is the exchanger effectiveness?

Options :

1. 0.56
2. 0.66
3. 0.76
4. 0.86

Question Number : 46 Question Id : 2999654366 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In Electrochemical machining, the material removal is due to

Options :

1. Corrosion
2. Erosion
3. Fusion
4. Ion displacement

Question Number : 47 Question Id : 2999654367 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The four stroke I.C. engine is running at maximum and minimum speeds of 1800 rpm and 600 rpm respectively. The coefficient of steadiness of the speed of the engine is _____.

Options :

1. 0.5
2. 1
3. 4
4. 1.5

Question Number : 48 Question Id : 2999654368 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The percentage of Chromium in 18-4-1 HSS is

Options :

1. 18

2. 4

3. 1

4. 0.75

Question Number : 49 Question Id : 2999654369 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For a shaft subjected to bending moment, M , and twisting moment 'T' simultaneously, the equivalent torque is given by

Options :

1. $\sqrt{M^2 + T^2}$

2. $M + \sqrt{M^2 + T^2}$

3. $M - \sqrt{M^2 + T^2}$

4. $T + \sqrt{M^2 + T^2}$

Question Number : 50 Question Id : 2999654370 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

USM is best suited for which materials?

Options :

1. Soft and ductile

2. Brittle

3. Porous and brittle

4. Ductile

Question Number : 51 Question Id : 2999654371 Question Type : MCQ Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

With increasing temperature of intake air, IC engine efficiency

Options :

1. decreases
2. increases
3. remains same
4. depends on other factors

Question Number : 52 Question Id : 2999654372 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The important parameter for natural convection

Options :

1. Prandtl number
2. Grashof number
3. Inertia force and viscous force
4. Molecular viscosity and thermal diffusivity

Question Number : 53 Question Id : 2999654373 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A flywheel of moment of inertia 9.8 kg m^2 fluctuates by 30 rpm for a fluctuation in energy of 1936 Joules. The mean speed of the flywheel in rpm is

Options :

1. 600
2. 900
3. 968

4. 29470

Question Number : 54 Question Id : 2999654374 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A gold ring ($k = 65 \text{ W/m K}$) measuring $15 \times 10 \times 60 \text{ cm}$ is exposed to a surface where $h = 11.5 \text{ W/m}^2 \text{ K}$. The value of Biot number _____.

Options :

1. 0.68

2. 0.48

3. 0.58

4. 0.38

Question Number : 55 Question Id : 2999654375 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The rate of increase of velocity with respect to change in the position of fluid particle in a flow field is called as

Options :

1. local acceleration

2. temporal acceleration

3. convective acceleration

4. temporal velocity

Question Number : 56 Question Id : 2999654376 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following gear is used to convert a rotational motion into a translational motion

Options :

1. Bevel gears
2. Double Helical gears
3. Worm gears
4. Rack and Pinion gears

Question Number : 57 Question Id : 2999654377 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

At a point in stressed body, the principal stresses are 200 N/mm^2 tensile and 100 N/mm^2 compressive. The yield strength of the material in tension is 500 MPa.

The factor of safety based on the maximum shear stress theory

Options :

1. 2.67 mm
2. 1.67 mm
3. 3.21 mm
4. 1.2 mm

Question Number : 58 Question Id : 2999654378 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The purpose of jig is _____.

Options :

1. for holding component
2. for guiding the cutting tool
3. for the positioning of component

4. for holding, positioning the component and guiding the cutting tool

Question Number : 59 Question Id : 2999654379 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following statement is true?

Options :

1. The 'GO' gauge controls the upper limit of the hole.
2. The 'NO GO' gauge controls the lower limit of the shaft.
3. The 'GO' gauge controls the lower limit of the hole.
4. The 'NO GO' gauge controls the lower limit of the hole.

Question Number : 60 Question Id : 2999654380 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A refrigerator rejects 240 kJ of heat per minute to the environment, if the compressor consumes 3 kW of power, its COP will be

Options :

1. 0.25
2. 0.5
3. 1
4. 1.5

Question Number : 61 Question Id : 2999654381 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

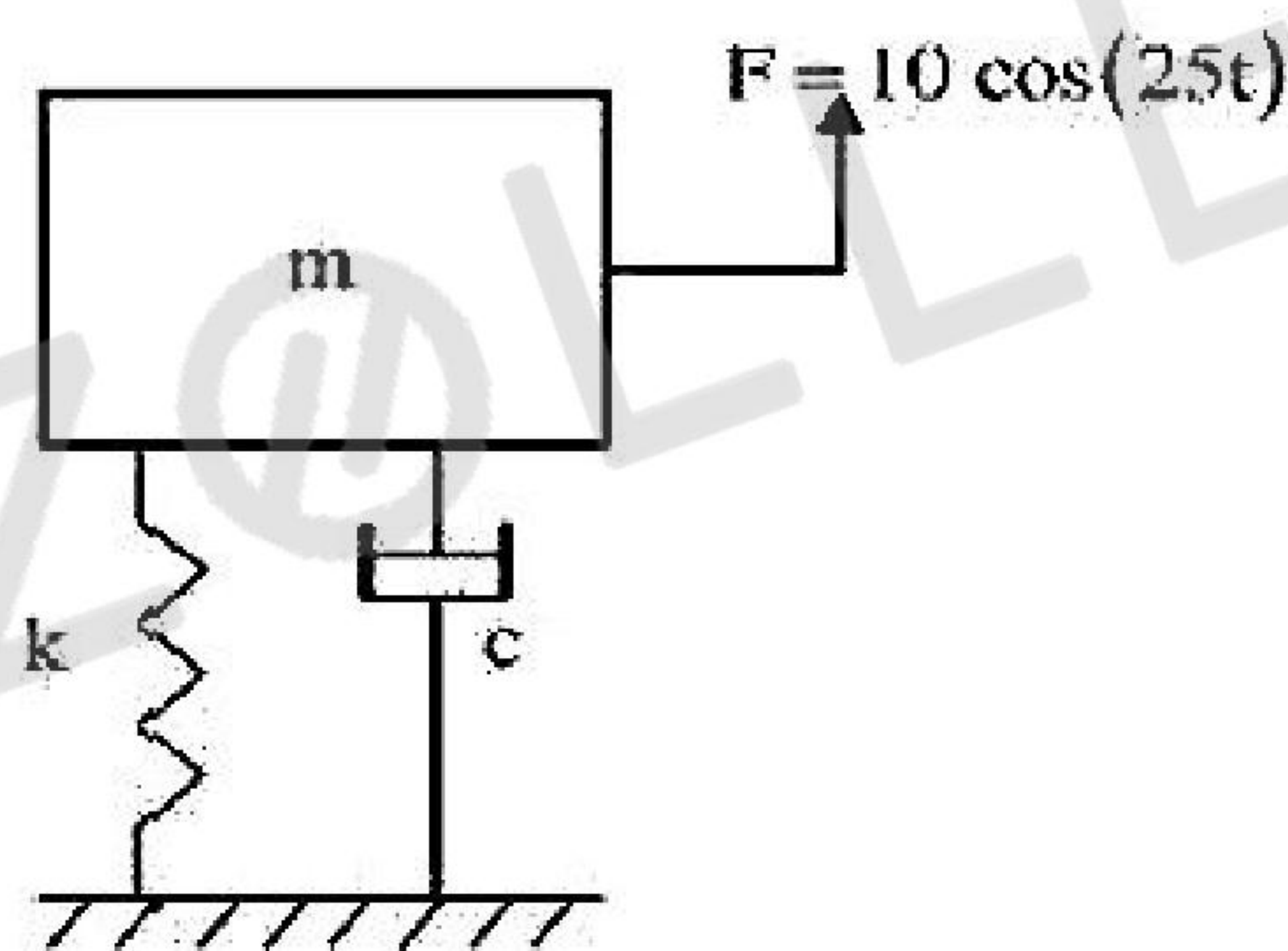
If viscosity of fluid is more, the thickness of boundary layer is

Options :

1. more
2. less
3. not affected by change in viscosity
4. unpredictable

Question Number : 62 Question Id : 2999654382 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A mass-spring-dashpot system with mass $m = 10$ kg, spring constant $k = 6250$ N/m is excited by a harmonic excitation of $10 \cos(25t)$ N. At the steady state, the vibration amplitude of the mass is 40 mm. The damping coefficient (c , in Ns/m) of the dashpot is



Options :

1. 8
2. 10
3. 12
4. 14

Question Number : 63 Question Id : 2999654383 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In vibrating system, the spring has a stiffness of 32 N/m with a mass of 2 kg. The system has a coefficient of viscous damping of 15 N s/m, the system is

Options :

1. Over damped
2. Under damped
3. Critically damped
4. Undamped

Question Number : 64 Question Id : 2999654384 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A lift has same acceleration while moving up and down with total weight W.

However, the tension in the cable while going up is twice the tension when lift is moving downward. Acceleration is

Options :

1. $\frac{g}{5}$
2. $\frac{g}{9}$
3. $\frac{g}{3}$
4. $\frac{g}{2}$

Question Number : 65 Question Id : 2999654385 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A machine element is subjected to the following bi-axial state of stress:
 $\sigma_x = 80 \text{ MPa}$; $\sigma_y = 20 \text{ MPa}$; $\tau_{xy} = 40 \text{ MPa}$. If the shear strength of the material is
100 MPa, the factor of safety as per Tresca's maximum shear stress theory is

Options :

1. 1
2. 2
3. 2.5
4. 3.3

Question Number : 66 Question Id : 2999654386 Question Type : MCQ Display Question Number : Yes Is
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Thermit welding is a form of

Options :

1. Resistance welding
2. Gas welding
3. Fusion welding
4. Forge welding

Question Number : 67 Question Id : 2999654387 Question Type : MCQ Display Question Number : Yes Is
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Hydraulic gradient line takes into consideration

Options :

1. potential and kinetic heads only
2. potential and pressure heads only

- 3. kinetic and pressure heads only
- 4. potential, kinetic and pressure heads

Question Number : 68 Question Id : 2999654388 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

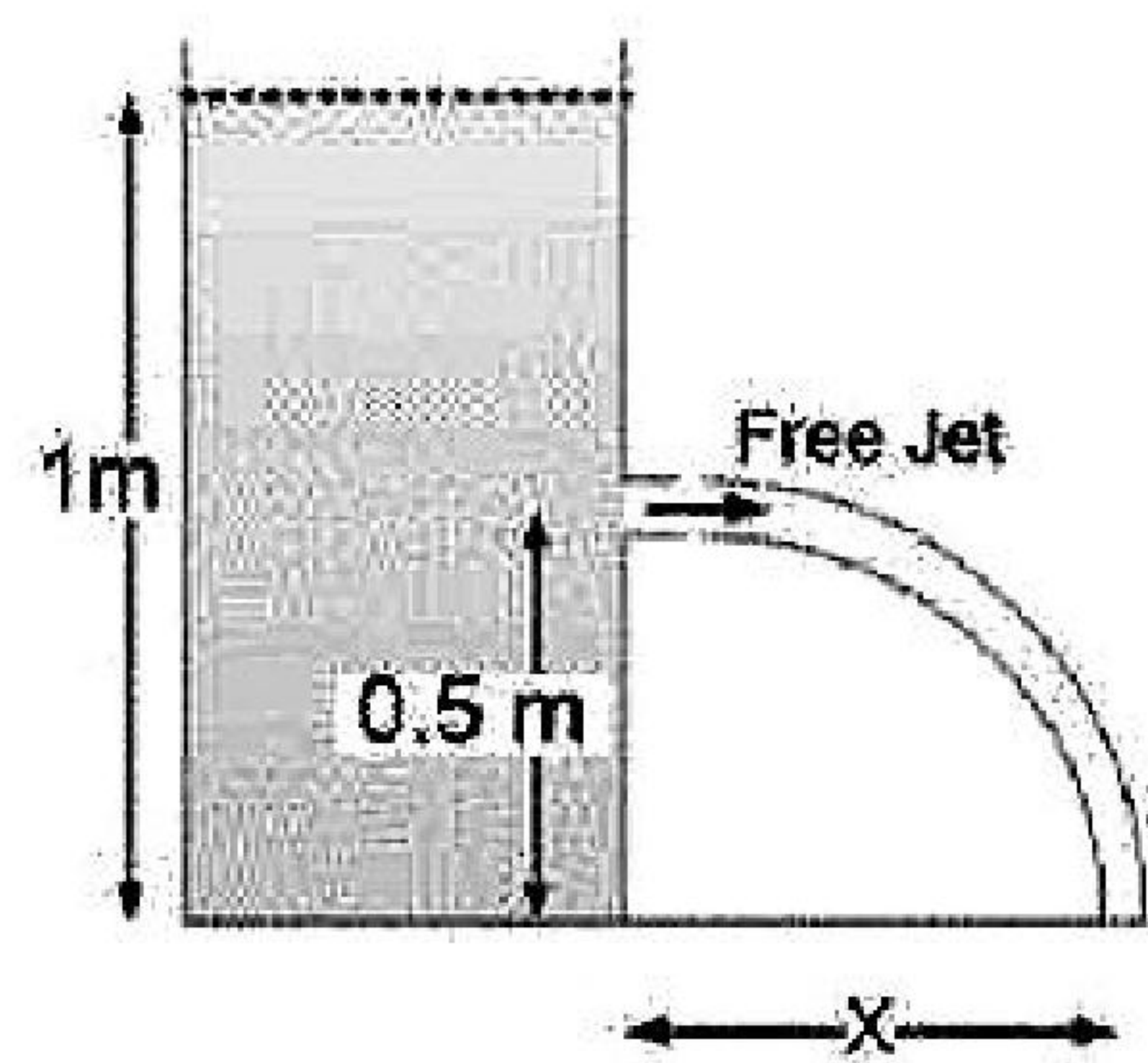
Joule's law states that the specific internal energy of a gas depends only on ____.

Options :

- 1. the pressure of the gas
- 2. the volume of the gas
- 3. the temperature of the gas
- 4. the density of the gas

Question Number : 69 Question Id : 2999654389 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A tank open at the top with a water level of 1 m, as shown in the figure, has a hole at a height of 0.5 m. A free jet leaves horizontally from the smooth hole. The distance X (in m) where the jet strikes the floor is



Options :

- 1. 0.5
- 2. 1.0

3. 2.0

4. 4.0

Question Number : 70 Question Id : 2999654390 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The gear train usually employed in clock is

Options :

1. Reverted gear train

2. Simple gear train

3. Sun and planet gear

4. Differential gear

Question Number : 71 Question Id : 2999654391 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Francis turbine is _____.

Options :

1. tangential flow

2. radial flow

3. axial flow

4. mixed flow

Question Number : 72 Question Id : 2999654392 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The atmospheric pressure is 0.9 bar absolute. If a gauge attached to a tank reads 390 mm of Hg vacuum, then the absolute pressure within the tank is _____ kPa.

Options :

1. 48
2. 58
3. 28
4. 38

Question Number : 73 Question Id : 2999654393 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A Newtonian fluid is defined as the fluid which

Options :

1. obeys Hook's law
2. is compressible
3. obeys Newton's law of viscosity
4. is incompressible

Question Number : 74 Question Id : 2999654394 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

L.P. cut-off occur in a refrigeration system during

Options :

1. if the ambient temperature is low.
2. if non-condensable gases are present in the condenser.
3. if refrigerant charge is low.
4. if lubricating oil gets accumulated in the condenser.

Question Number : 75 Question Id : 2999654395 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In a single server infinite population queuing model, arrivals follow a Poisson distribution with mean 4 per hour. The service times are exponential with mean service time to 12 minutes. The expected length of the queue will be _____.

Options :

1. 2.3
2. 3.2
3. 5.2
4. 10.2

Question Number : 76 Question Id : 2999654396 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Lumped heat transfer analysis of a solid object suddenly exposed to a fluid medium at a different temperature is valid when

Options :

1. Biot number < 0.1
2. Biot number > 0.1
3. Fourier number < 0.1
4. Fourier number > 0.1

Question Number : 77 Question Id : 2999654397 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A cylindrical Uranium fuel rod of radius 5 mm in a nuclear reactor is generating heat at the rate of $4 \times 10^7 \text{ W/m}^3$. The rod is cooled by a liquid (convective heat transfer coefficient $1000 \text{ W/m}^2\text{-K}$) at 25°C . At steady state, the surface temperature (in K) of the rod is

Options :

1. 308
2. 398
3. 448
4. 418

Question Number : 78 Question Id : 2999654398 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The fluctuation of energy in an I.C. engine is given as 70% of the energy developed per cycle. If the engine develops 5 kW at 1200 rpm the fluctuation of energy is _____ .

Options :

1. 350 J
2. 700 J
3. 1400 J
4. 2800 J

Question Number : 79 Question Id : 2999654399 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the definition of Biot number $B_i = \frac{hL}{k}$, the thermal conductivity of k relates to

Options :

1. Solid body involved
2. Environment
3. Fluid

4. Gas

Question Number : 80 Question Id : 2999654400 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A rotary system has a damping coefficient of 40 Nm-sec/rad. The damping torque at a velocity of 2 rad/sec, will be

Options :

1. 20 N-m

2. 40 N-m

3. 80 N-m

4. 100 N-m

Question Number : 81 Question Id : 2999654401 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Saturated vapor is condensed to saturated liquid in a condenser. The heat capacity ratio is $C_r = \frac{C_{min}}{C_{max}}$. The effectiveness (ϵ) of the condenser is

Options :

1. $\frac{1 - \exp[-NTU(1 + C_r)]}{1 + C_r}$

2. $\frac{1 - \exp[-NTU(1 - C_r)]}{1 - C_r[-NTU(1 - C_r)]}$

3. $\frac{NTU}{1 + NTU}$

4. $1 - \exp(-NTU)$

Question Number : 82 Question Id : 2999654402 Question Type : MCQ Display Question Number : Yes Is

Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Among the following, the controlling activity is

Options :

1. Scheduling
2. Routing
3. Dispatching
4. Expediting

Question Number : 83 Question Id : 2999654403 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Efficiency of Pelton wheel shall be maximum if the ratio of jet velocity to tangential velocity of the wheel is

Options :

1. $\frac{1}{2}$
2. 1
3. 2
4. 4

Question Number : 84 Question Id : 2999654404 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

TIG welding is best suited for welding

Options :

1. Mild steel
2. Stainless steel

3. Silver

4. Aluminium

Question Number : 85 Question Id : 2999654405 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following pairs of equations describes an irreversible heat engine?

Options :

1. $\oint dQ > 0$ and $\oint \frac{dQ}{T} < 0$

2. $\oint dQ < 0$ and $\oint \frac{dQ}{T} < 0$

3. $\oint dQ > 0$ and $\oint \frac{dQ}{T} > 0$

4. $\oint dQ < 0$ and $\oint \frac{dQ}{T} > 0$

Question Number : 86 Question Id : 2999654406 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Critical (or) whirling speed of a rotating shaft is defined as

Options :

1. speed at which shaft tends to vibrate violently

2. speed at which shaft tends to rotate slowly

3. speed at which shaft has no vibration

4. speed at which shaft is rotating with medium speed

Question Number : 87 Question Id : 2999654407 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The parts are processing on the machines launched into the system in the order of their arrivals then the process is related to _____

Options :

1. Earliest due date (EDD)
2. First come first served (FCFS)
3. Shortest processing time (SPT)
4. Shortest operation time (SOT)

Question Number : 88 Question Id : 2999654408 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A fuel will detonate less when it has

Options :

1. Lower self-ignition temperature
2. Subzero self ignition temperature
3. Higher self-ignition temperature
4. Zero self ignition temperature

Question Number : 89 Question Id : 2999654409 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A hollow shaft is to transmit a torque of 3500 Nm. The diametral ratio of the hollow shaft is 0.5. The permissible shear stress of the material is 80 MPa. The inside diameter of the shaft is

Options :

1. 28 mm
2. 31 mm

3. 62 mm

4. 35 mm

Question Number : 90 Question Id : 2999654410 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The INCORRECT statement about the characteristics of critical point of a pure substance is that

Options :

1. there is no constant temperature vaporization process

2. it has point of inflection with zero slope

3. the ice directly converts from solid phase to vapor phase

4. saturated liquid and saturated vapor states are identical

Question Number : 91 Question Id : 2999654411 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The total number of decision variables in the objective function of the assignment problem of size $n \times n$ (n jobs $\times$ n machines) is

Options :

1. n^2

2. $2n$

3. $2n-1$

4. n

Question Number : 92 Question Id : 2999654412 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For the measurement of thermodynamic property known as temperature, is based on

Options :

1. Zeroth law of thermodynamics
2. First law of thermodynamics
3. Second law of thermodynamics
4. Third law of thermodynamics

Question Number : 93 Question Id : 2999654413 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

An air-standard Diesel cycle consists of the following processes:

- 1-2: Air is compressed isentropically.
- 2-3: Heat is added at constant pressure.
- 3-4: Air expands isentropically to the original volume.
- 4-1: Heat is rejected at constant volume.

If γ and T denote the specific heat ratio and temperature, respectively, the efficiency of the cycle is

Options :

1. $1 - \frac{T_4 - T_1}{T_3 - T_2}$
2. $1 - \frac{T_4 - T_1}{\gamma(T_3 - T_2)}$
3. $1 - \frac{\gamma(T_4 - T_1)}{T_3 - T_2}$
4. $1 - \frac{T_4 - T_1}{(\gamma - 1)(T_3 - T_2)}$

Question Number : 94 Question Id : 2999654414 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Metallic patterns are generally used for

Options :

1. Small castings
2. Medium castings
3. Complicated castings
4. Mass production of castings

Question Number : 95 Question Id : 2999654415 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The flatness of a machine bed can be measured using

Options :

1. Vernier calipers
2. Auto collimator
3. Height gauges
4. Tool maker's microscope

Question Number : 96 Question Id : 2999654416 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which one of the following is an accessory on a boiler?

Options :

1. Pressure gauge
2. Water level indicator
3. Economizer
4. Feed check valve

Question Number : 97 Question Id : 2999654417 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A solid disc of radius 'r' rolls without slipping on a horizontal floor with angular velocity ' ω ' and angular acceleration ' α '. The magnitude of the acceleration of the point of contact on the disc is

Options :

1. zero
2. 1
3. $\sqrt{(r\alpha)^2 + (r\omega^2)^2}$
4. $r\omega^2$

Question Number : 98 Question Id : 2999654418 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For air with a relative humidity of 80%

Options :

1. the dry bulb temperature is less than the wet bulb temperature.
2. the dry bulb and dew point temperatures are same.
3. the dew point and wet bulb temperature are equal.
4. the dew point temperature is less than the wet bulb temperature.

Question Number : 99 Question Id : 2999654419 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Thick walled cylinders can be produced by

Options :

1. Hot drawing
2. Hot extrusion
3. Cold drawing
4. Continuous drawing

Question Number : 100 Question Id : 2999654420 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For a speed ratio of 100, smallest gearbox is obtained by using

Options :

1. Pairs of spur gears
2. A pair of bevel and a pair of spur gear in compound gear train
3. The pair of helical and a pair of spur gear in compound gear train
4. A pair of helical gear and a pair of worm gear in compound gear train

Question Number : 101 Question Id : 2999654421 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In powder metallurgy, the operation carried out to improve the bearing property of a bush is called

Options :

1. Infiltration
2. Impregnation
3. Plating
4. Heat treatment

Question Number : 102 Question Id : 2999654422 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If there are two bars of small diameter with axis at the end for the first bar and at the center of the second bar, then the ratio of radius of gyration for two bars is ____.

Options :

1. 3:2

2. 1:2

3. 2:1

4. 4:3

Question Number : 103 Question Id : 2999654423 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the evaporator pressure increases keeping the condensing pressure constant in a Vapour Compression Refrigeration System,

Options :

1. COP value decreases and compression work increases

2. COP value decreases and compression work decreases

3. COP value increases and compression work increases

4. COP value increases and compression work decreases

Question Number : 104 Question Id : 2999654424 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the FNSD analysis of inventory control, the items are categorized based on

Options :

1. Consumption rate

2. Cost of the item
3. Availability of the item
4. Size of the item

Question Number : 105 Question Id : 2999654425 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Heat transfer takes place as per

Options :

1. zeroth law of thermodynamics
2. first law of thermodynamics
3. second law of the thermodynamics
4. Stefan's law

Question Number : 106 Question Id : 2999654426 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which comparator utilizes the principles of a button spinning on loop of a string?

Options :

1. Abramson comparator
2. Sigma comparator
3. Optical comparator
4. Eden-Rolt comparator

Question Number : 107 Question Id : 2999654427 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Hot coffee in a cup is allowed to cool. Its cooling rate is measured and found to be greater than the value calculated by conduction, convection and radiation measurements. The difference is due to

Options :

1. Properties of coffee changing with temperature
2. Currents of air flow in the room
3. Underestimation of the emissivity of coffee
4. Evaporation

Question Number : 108 Question Id : 2999654428 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For the same compression ratio and heat addition

Options :

1. $\eta_{\text{Otto}} > \eta_{\text{Diesel}} > \eta_{\text{Dual}}$
2. $\eta_{\text{Diesel}} > \eta_{\text{Otto}} > \eta_{\text{Dual}}$
3. $\eta_{\text{Otto}} > \eta_{\text{Dual}} > \eta_{\text{Diesel}}$
4. $\eta_{\text{Dual}} > \eta_{\text{Diesel}} > \eta_{\text{Otto}}$

Question Number : 109 Question Id : 2999654429 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Crater wear always starts at some distance from the tool tip because at that point

Options :

1. cutting fluid does not penetrate
2. chip tool interface temperature is maximum
3. normal stress on rake face is maximum

4. tool strength is minimum

Question Number : 110 Question Id : 2999654430 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A shell of 100 mm diameter and 100 mm height with the corner radius of 0.4 mm is to be produced by cup drawing. The required blank diameter is

Options :

1. 118 mm
2. 161 mm
3. 224 mm
4. 312 mm

Question Number : 111 Question Id : 2999654431 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

When two bodies collide without the presence of any other forces or force fields,

Options :

1. their total momentum must be conserved
2. their total kinetic energy must be conserved
3. the collision must be direct
4. the collision must be central

Question Number : 112 Question Id : 2999654432 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A cube shaped casting solidifies in 5 min. The solidification time in minutes for a cube of same material, which is 8 times heavier than the original casting will be

Options :

1. 10
2. 20
3. 24
4. 40

Question Number : 113 Question Id : 2999654433 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In a turbulent flow, Reynold's number is

Options :

1. less than 4000
2. more than 4000
3. between 2000 and 4000
4. less than 2000

Question Number : 114 Question Id : 2999654434 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The tool of an NC machine has to move along a circular arc from (5,5) to (10,10) while performing an operation. The center of the arc is at (10,5). Which one of the following NC tool path commands performs the above mentioned operation?

Options :

1. N010 G02 X10 Y10 X5 Y5 R5
2. N010 G03 X10 Y10 X5 Y5 R5
3. N010 G01 X5 Y5 X10 Y10 R5

4. N010 G02 X5 Y5 X10 Y10 R5

Question Number : 115 Question Id : 2999654435 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The air conditioning process for human comfort that may be applied in a room where the temperature is 35°C and the relative humidity is 80%

Options :

1. Cooling and dehumidification
2. Evaporative cooling
3. Steam heating
4. Both heating and cooling

Question Number : 116 Question Id : 2999654436 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Turning the cap of a pen is an example of

Options :

1. Moment
2. Force
3. Couple
4. Impulse

Question Number : 117 Question Id : 2999654437 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In orthogonal turning of a low carbon steel bar of diameter 150 mm with uncoated carbide tool, the cutting velocity is 90 m/min. The feed is 0.24 mm/rev and the depth of cut is 2 mm. The chip thickness obtained is 0.48 mm. If the orthogonal rake angle is zero and the principle cutting edge angle is 90° , the shear angle in degrees is

Options :

1. 20.56
2. 26.56
3. 30.56
4. 36.56

Question Number : 118 Question Id : 2999654438 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following features improves the fatigue strength of a metallic material?

Options :

1. Increasing temperature
2. Scratching the surface
3. Under stressing
4. Over stressing

Question Number : 119 Question Id : 2999654439 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The efficiency of a Carnot engine is 0.75. If this is reversed as a Refrigerator, what is the maximum COP attainable?

Options :

1. 2

2. 7.5

3. 0.3

4. 3.4

Question Number : 120 Question Id : 2999654440 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Brazing and soldering are

Options :

1. heterogeneous joining methods

2. autogenous joining methods

3. homogeneous joining methods

4. plastic joining methods