Chhattisgarh Public Service Commission

Notations :

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

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

Question Paper Name:	Mechanical Engineering 25th February 2018 Shift 2
Subject Name:	Mechanical Engineering
Duration:	150
Calculator:	None
Magnifying Glass Required?:	No
Ruler Required?:	No
Eraser Required?:	No
Scratch Pad Required?:	No
Rough Sketch/Notepad Required?:	No
Protractor Required?:	No

Mechanical Engineering

Group Maximum Duration :	0
Group Minimum Duration :	150
Revisit allowed for view? :	No
Revisit allowed for edit? :	No

Mechanical Engineering

Section Id :	34753550
Section Number :	1
Section type :	Online
Mandatory or Optional:	Mandatory
Display Number Panel:	Yes
Group All Questions:	No

Question Number : 1 Question Id : 3475353852 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The unit of thermal diffusivity is given as:

Options :

1. ✖ m/s^2

2. ✖ Watt

3. ✖ m^2/s^2

4. ✔ m^2/s

5. ✘ m^3/s

Question Number : 2 Question Id : 3475353853 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is correct for critical radius of insulation (r_c)?

Options :

1. ✘ The rate of heat transfer is minimum at critical radius of insulation.

2. ✔ Rate of heat transfer is maximum at critical radius of insulation.

3. ✘ Rate of heat transfer is zero at critical radius of insulation.

4. ✘ Resistance to heat flow is maximum at critical radius of insulation.

5. ✘ $(r_c)_{cylindrical\ pipe} = \dfrac{4 \times \text{thermal conductivity of insulating material}}{\text{heat transfer coefficint between insulation surface and air}}$

Question Number : 3 Question Id : 3475353854 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Non-dimensional temperature distribution for lumped system analysis is given by:

[where, B_i = Biot number, F_0 = Fourier number, T_0 = Initial temperature, T_∞ = Environmental temperature]

Options :

1. ✘ $\dfrac{T - T_\infty}{T_0 - T_\infty} = e^{-\left(B_i/F_0\right)}$

2. ✘ $\dfrac{T - T_\infty}{T_0 - T_\infty} = e^{-\left(B_i^2 \times F_0^2\right)}$

3. ✔ $\dfrac{T - T_\infty}{T_0 - T_\infty} = e^{-\left(B_i \times F_0\right)}$

4. ✘ $\dfrac{T - T_\infty}{T_0 - T_\infty} = e^{-\left(B_i^2 \times F_0\right)}$

5. ✘ $\dfrac{T - T_\infty}{T_0 - T_\infty} = \ln\left(B_i^2 \times F_0\right)$

Question Number : 4 **Question Id : 3475353855** **Question Type : MCQ** **Display Question Number : Yes** **Single Line Question Option : No** **Option Orientation : Vertical**

Correct : 2 **Wrong : 0**

The differential governing equation for the fin of uniform cross-sectional area (A_c) and constant thermal conductivity (k) is written as $\frac{d^2\theta}{dx^2} - m^2\theta = 0$. Which of the following is correct for this equation? [where, p = Perimeter of fin, h = Convective heat transfer coefficient]

Options :

1. ✖ θ = Temperature of fin; $m = \sqrt{\frac{hp}{kA_c}}$

2. ✖ θ = Excess temperature; $m = \frac{hp}{kA_c}$

3. ✔ θ = Excess temperature; $m = \sqrt{\frac{hp}{kA_c}}$

4. ✖ θ = Temperature of fin; $m = \frac{hp}{kA_c}$

5. ✖ θ = Excess temperature; $m = \left(\frac{hp}{kA_c}\right)^{3/2}$

Question Number : 5 **Question Id : 3475353856** **Question Type : MCQ** **Display Question Number : Yes** **Single Line Question Option : No** **Option Orientation : Vertical**

Correct : 2 **Wrong : 0**

The ratio, $\left(\frac{\text{Molecular diffusivity of momentum}}{\text{Molecular diffusivity of heat}}\right)$, is known as:

Options :

1. ✔ Prandtl number (Pr)

2. ✖ $\frac{1}{\text{Prandtl number (Pr)}}$

3. ✖ Nusselt number (Nu)

4. ✖ $\frac{1}{\text{Nusselt number (Nu)}}$

5. ✖ Peclet number (Pc)

Question Number : 6 **Question Id : 3475353857** **Question Type : MCQ** **Display Question Number : Yes** **Single Line Question Option : No** **Option Orientation : Vertical**

Correct : 2 **Wrong : 0**

Grashof number may be defined as:

Options :

1. ✗ $$\frac{\text{Buoyancy force acting on fluid}}{\text{Inertia force acting on fluid}}$$

2. ✓ $$\frac{\text{Buoyancy force acting on fluid}}{\text{Viscous force acting on fluid}}$$

3. ✗ $$\frac{\text{Viscous force acting on fluid}}{\text{Inertia force acting on fluid}}$$

4. ✗ $$\sqrt{\frac{\text{Buoyancy force acting on fluid}}{\text{Inertia force acting on fluid}}}$$

5. ✗ $$\sqrt{\frac{\text{Viscous force acting on fluid}}{\text{Inertia force acting on fluid}}}$$

Question Number : 7 Question Id : 3475353858 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is not the regimes of pool boiling?

Options :

1. ✗ Natural convection boiling

2. ✗ Nucleate boiling

3. ✗ Film boiling

4. ✓ Flow boiling

5. ✗ Transition boiling

Question Number : 8 Question Id : 3475353859 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For the opaque surfaces, which of the following relation is correct? [where, τ = Transmissivity, α = Absorptivity, ρ = Reflectivity]

Options :

1. ✗ $\alpha + \tau = 1, \alpha > 0, \tau > 0, \rho > 0$

2. ✗ $\alpha = \rho = 1$

3. ✔ $\alpha + \rho = 1, \tau = 0$

4. ✘ $\alpha = \tau = 1$

5. ✘ $\tau = 1, \rho = 0, \ \alpha = 0$

Question Number : 9 Question Id : 3475353860 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A glass window 3 m high, 5 m wide, 0.3 m thick of thermal conductivity k = 0.9 W/m-K, having inner and outer surface temperature as 16 °C and 2 °C respectively. The rate of heat loss and thermal resistance of the glass will be respectively given by:

Options :

1. ✘ 63 W, 0.022 K/W

2. ✘ 630 W, 0.22 K/W

3. ✔ 630 W, 0.022 K/W

4. ✘ 63 W, 0.22 K/W

5. ✘ 6.3 W, 2.2 K/W

Question Number : 10 Question Id : 3475353861 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What will be the density of fluid having dynamic viscosity of 0.05 poise and kinematic viscosity of 0.04 stokes?

Options :

1. ✘ $125 \ \text{kg/m}^3$

2. ✘ $12.5 \ \text{kg/m}^3$

3. ✔ $1250 \ \text{kg/m}^3$

4. ✘ $1.25 \ \text{kg/m}^3$

5. ✘ $12500 \ \text{kg/m}^3$

Question Number : 11 Question Id : 3475353862 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A square plate (side = a) lies in the vertical position in the water with its upper horizontal edge coincides with water surface. Total pressure force (F) and position of center of pressure (h^*) on the plane surface will be respectively given by:

[where, ρ is the density of water]

Options :

1. ✖ $F = \dfrac{\rho g a^3}{3}, h^* = \dfrac{2}{3} a$

2. ✖ $F = \dfrac{\rho g a^3}{4}, h^* = \dfrac{2}{5} a$

3. ✖ $F = \dfrac{\rho g a^3}{2}, h^* = \dfrac{2}{5} a$

4. ✔ $F = \dfrac{\rho g a^3}{2}, h^* = \dfrac{2}{3} a$

5. ✖ $F = \dfrac{\rho g a^3}{5}, h^* = \dfrac{2}{7} a$

Question Number : 12 Question Id : 3475353863 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Pressure drop (ΔP) in a viscous flow through circular pipe of radius (R), length (L) with fluid of density (ρ), viscosity (μ) and flowing with average velocity (V) is given by:

Options :

1. ✖ $\dfrac{32 \mu V L}{\rho g R^2}$

2. ✔ $\dfrac{8 \mu V L}{R^2}$

3. ✖ $\dfrac{32 \mu V L}{R^2}$

4. ✖ $\dfrac{8 \mu V L}{\rho g R^2}$

5. ✖ $\dfrac{16 \mu V L}{\rho g R^2}$

Question Number : 13 Question Id : 3475353864 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The dimensionless number $\left(\dfrac{Inertia\ force}{Gravity\ force}\right)^{1/2}$ is known as:

Options :

1. ✔ Froude number

2. ✘ Euler number

3. ✘ Weber number

4. ✘ Mach number

5. ✘ Reynolds number

Question Number : 14 Question Id : 3475353865 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Momentum thickness is defined as:

Options :

1. ✘ $\int_0^\delta \left(1 - \frac{u}{U}\right) dy$

2. ✔ $\int_0^\delta \frac{u}{U}\left(1 - \frac{u}{U}\right) dy$

3. ✘ $\int_0^\delta \frac{u}{U}\left(1 - \frac{u^2}{U^2}\right) dy$

4. ✘ $\int_0^\delta \frac{u^2}{U^2}\left(1 - \frac{u^2}{U^2}\right) dy$

5. ✘ $\int_0^\delta \left(1 - \frac{u^2}{U^2}\right) dy$

Question Number : 15 Question Id : 3475353866 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If the pipe diameter is suddenly enlarged such that the velocity of flow is decreased from 8 m/s to 2 m/s. The head loss due to this enlargement will be: [g = 10 m/s^2]

Options :

1. ✔ 1.8 m of water

2. ✘ 0.18 m of water

3. ✖ 18 m of water

4. ✖ 0.018 m of water

5. ✖ 9 m of water

Question Number : 16 Question Id : 3475353867 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If coefficient of discharge for an orifice is 0.6, coefficient of velocity is 0.95, then the coefficient of contraction will be:

Options :

1. ✖ 0.57

2. ✔ 0.631

3. ✖ 1.58

4. ✖ 1

5. ✖ 0.921

Question Number : 17 Question Id : 3475353868 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If pressure increases in the direction of flow over a solid body, it is:

Options :

1. ✖ favorable pressure gradient and leading to increase in velocity of flow

2. ✔ adverse pressure gradient and leading to separation

3. ✖ favorable pressure gradient and leading to separation

4. ✖ adverse pressure gradient and leading to increase in velocity of flow

5. ✖ favorable pressure gradient causes the velocity to remain constant

Question Number : 18 Question Id : 3475353869 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Kaplan turbine is an example of:

Options :

1. ✖ low head and tangential flow turbine

2. ✔ low head and axial flow turbine

3. ✘ high head and mixed flow turbine

4. ✘ high head and axial flow turbine

5. ✘ high head and tangential flow turbine

Question Number : 19 Question Id : 3475353870 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Cavitation may occur at:

Options :

1. ✔ the exit of reaction turbine

2. ✘ the inlet of reaction turbine

3. ✘ discharge side of centrifugal pump

4. ✘ the inlet of penstock of hydroelectric power plant

5. ✘ at the bucket of Pelton turbine

Question Number : 20 Question Id : 3475353871 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The component fitted in the suction and delivery pipe to maintain the uniform velocity of flow of liquid in single acting reciprocating pump is:

Options :

1. ✔ Air vessel

2. ✘ Hydraulic coupling

3. ✘ Hydraulic press

4. ✘ Hydraulic intensifier

5. ✘ Supercharger

Question Number : 21 Question Id : 3475353872 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Due to the presence of friction over the blade of steam turbine, blade velocity coefficient exists and is defined as:

Options :

1. ✔
$$\frac{\text{Relative velocity of the steam at the exit of blade}}{\text{Relative velocity of the steam at the inlet of blade}}$$

2. ✖
$$\frac{\text{Absolute velocity of the steam at the exit of blade}}{\text{Absolute velocity of the steam at the inlet of blade}}$$

3. ✖
$$\frac{\text{Relative velocity of the steam at the inlet of blade}}{\text{Relative velocity of the steam at the exit of blade}}$$

4. ✖
$$\frac{\text{Absolute velocity of the steam at the inlet of blade}}{\text{Absolute velocity of the steam at the exit of blade}}$$

5. ✖
$$\frac{\text{Relative velocity of the steam at the exit of blade}}{\text{Absolute velocity of the steam at the inlet of blade}}$$

Question Number : 22 Question Id : 3475353873 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For maximum blade efficiency of single stage impulse turbine, the blade speed ratio is given as: (where α = nozzle angle)

Options :

1. ✖ $cos\,\alpha$

2. ✖ $cos^2\alpha$

3. ✖ $\dfrac{cos^2\alpha}{2}$

4. ✔ $\dfrac{cos\,\alpha}{2}$

5. ✖ $\dfrac{1-cos\,\alpha}{2}$

Question Number : 23 Question Id : 3475353874 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Maximum efficiency of Parson's reaction turbine is given by: (where α = Nozzle angle)

Options :

1. ✖ $\dfrac{2\,cos\,\alpha}{1+cos\alpha}$

$$2. \times \frac{\cos^2\alpha}{1+\cos\alpha}$$

$$3. \times \frac{\cos^2\alpha}{1+\cos^2\alpha}$$

$$4. \checkmark \frac{2\cos^2\alpha}{1+\cos^2\alpha}$$

$$5. \times \frac{2\cos^2\alpha}{1+2\cos^2\alpha}$$

Question Number : 24 Question Id : 3475353875 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is the part of gas turbine plant?

Options :

1. ✔ Compressor

2. ✖ Condenser

3. ✖ Pelton turbine

4. ✖ Thermostatic expansion valve

5. ✖ Kaplan turbine

Question Number : 25 Question Id : 3475353876 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Back work ratio of gas turbine plant is:

Options :

1. ✖ $\dfrac{\text{Turbine work}}{\text{Compressor work}}$

2. ✖ $\dfrac{\text{Turbine work}}{\text{Heat input}}$

3. ✖ $\dfrac{\text{Compressor work}}{\text{Heat input}}$

4. ✔ $\dfrac{\text{Compressor work}}{\text{Turbine work}}$

5. ✘ $\dfrac{\text{Turbine work} - \text{Compressor work}}{\text{Turbine work}}$

Question Number : 26 Question Id : 3475353877 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The resultant of two forces A and B is perpendicular to A. the angle between the forces A and B will be:

Options :

1. ✘ $\theta = \cos^{-1}\left(\dfrac{A}{B}\right)$

2. ✘ $\theta = \cos^{-1}\left(\dfrac{B}{A}\right)$

3. ✘ $\theta = \cos^{-1}\left(-\dfrac{B}{A}\right)$
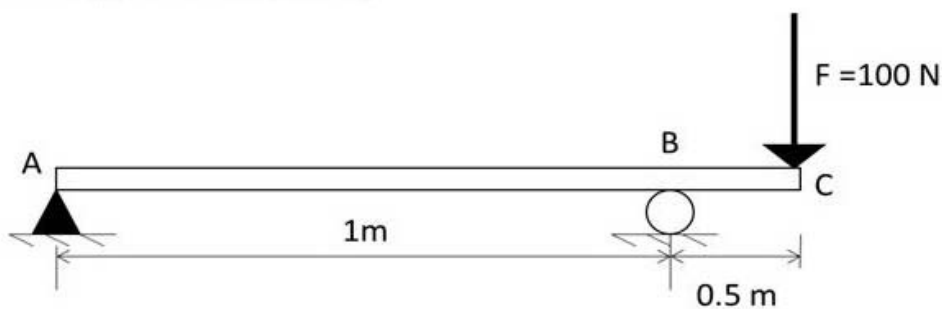
4. ✔ $\theta = \cos^{-1}\left(-\dfrac{A}{B}\right)$

5. ✘ $\theta = \tan^{-1}\left(\dfrac{B}{A}\right)$

Question Number : 27 Question Id : 3475353878 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A beam **ABC** is supported at A (hinge support) and B (roller support). If a force of 100 N is applied at C as given in figure, then the reaction at the supports will be given by:

Options :

1. ✔ $R_A = 50\,\text{N}(\downarrow); \ R_B = 150\,\text{N}(\uparrow)$

2. ✘ $R_A = 50\,\text{N}(\uparrow); \ R_B = 100\,\text{N}(\downarrow)$
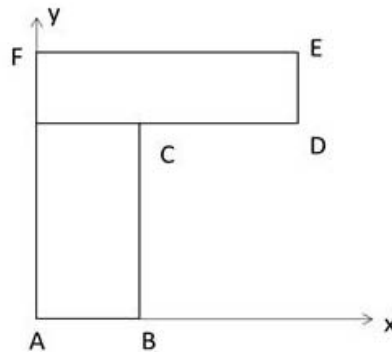
3. ✖ $R_A = 150\,N(\uparrow);\ R_B = 50\,N(\downarrow)$

4. ✖ $R_A = 150\,N(\downarrow);\ R_B = 50\,N(\uparrow)$

5. ✖ $R_A = 50\,N(\downarrow);\ R_B = 150\,N(\downarrow)$

Question Number : 28 Question Id : 3475353879 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The coordinates of centroid of given geometry ABCDEFA [DE = 20mm, EF = 80 mm, FA = 100 mm, AB = 20 mm] will be given as: (A is origin)

Options :

1. ✖ (60, 20)

2. ✖ (25, 60)

3. ✔ (25, 65)

4. ✖ (65, 25)

5. ✖ (25, 40)

Question Number : 29 Question Id : 3475353880 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The coordinates of centroid (x, y) of quarter circular lamina of radius (R), whose straight edges coincide with the coordinate axis in the first quadrant, are given as:

Options :

1. ✖ $(0,\ 4R/3\pi)$

2. ✖ $(4R/3\pi,\ 0)$

3. ✖ $(4R/3\pi,\ 8R/3\pi)$

4. ✔ $(4R/3\pi,\ 4R/3\pi)$

5. ✖ $(8R/3\pi,\ 8R/3\pi)$

Question Number : 30 Question Id : 3475353881 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The moment of inertia of a rectangular section of base (b), height (h) about its base will be:

Options :

1. ✖ $\dfrac{hb^3}{12}$

2. ✔ $\dfrac{bh^3}{3}$

3. ✖ $\dfrac{bh^3}{12}$

4. ✖ $\dfrac{hb^3}{3}$

5. ✖ $\dfrac{bh^3}{36}$

Question Number : 31 Question Id : 3475353882 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Moment of inertia of a quarter circle (diameter = d) about its straight edge is given by:

Options :

1. ✖ $\dfrac{\pi d^4}{64}$

2. ✖ $\dfrac{\pi d^4}{128}$

3. ✔ $\dfrac{\pi d^4}{256}$

4. ✖ $\dfrac{\pi d^4}{512}$

5. ✖ $\dfrac{\pi d^4}{32}$

Question Number : 32 Question Id : 3475353883 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A car travels from one city to another with the uniform speed of 40 km/hr for half distance and with the uniform speed of 60 km/hr for remaining half distance. The average speed of car is:

Options :

1. ✖ 40 km/hr

2. ✖ 45 km/hr

3. ✔ 48 km/hr

4. ✖ 50 km/hr

5. ✖ 42 km/hr

Question Number : 33 Question Id : 3475353884 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Two blocks of 50 N and 100 N are connected by a light cord passing over a smooth frictionless pulley. The acceleration in blocks and tension in rope are respectively given by: [g = acceleration due to gravity]

Options :

1. ✖ g/2, 40 N

2. ✔ g/3, 66.67 N

3. ✖ g, 200 N

4. ✖ g/5, 40 N

5. ✖ g/4, 50 N

Question Number : 34 Question Id : 3475353885 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is correct relation among elastic constants E (modulus of elasticity), G (modulus of rigidity), v (Poisson's ratio) and K (bulk modulus)?

Options :

1. ✖ $E = 3K (1 - v) = 2G (1 + v)$

2. ✖ $E = 2G (1 - v) = 3K (1 + v)$

3. ✔ $E = 3K (1 - 2v) = 2G (1 + v)$

4. ✖ $E = 2K(1 - 2v) = 3G(1 + v)$

5. ✖ $E = 3K(1 + 2v) = 2G(1 - v)$

Question Number : 35 Question Id : 3475353886 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Radius of Mohr's circle is represented as: [where $\sigma_{p1} > 0$ and $\sigma_{p2} > 0$ are the major and minor value of principal stresses]

Options :

1. ✖ $\sigma_{p1} - \sigma_{p2}$

2. ✔ $\dfrac{\sigma_{p1} - \sigma_{p2}}{2}$

3. ✖ $\sigma_{p1} + \sigma_{p2}$

4. ✖ $\dfrac{\sigma_{p1} + \sigma_{p2}}{2}$

5. ✖ $\dfrac{\sigma_{p1} \times \sigma_{p2}}{2}$

Question Number : 36 Question Id : 3475353887 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If principal stress $\sigma_{p1} = 100$ N/mm^2 (tensile) and $\sigma_{p2} = 40$ N/mm^2 (compressive), then maximum shear stress will be:

Options :

1. ✔ 70 N/mm^2

2. ✖ 50 N/mm^2

3. ✖ 30 N/mm^2

4. ✖ 10 N/mm^2

5. ✖ 5 N/mm^2

Question Number : 37 Question Id : 3475353888 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A thin walled cylinder (diameter = D, length = L, thickness of cylinder material = t, modulus of elasticity = E, Poisson's ratio = v) is subjected to fluid pressure (P) inside it. The total volume of fluid that can be stored in the cylinder will be:

Options :

1. ✔ $\dfrac{\pi}{4}D^2 L\left[1 + \dfrac{PD}{4tE}(5 - 4v)\right]$

2. ✘ $\dfrac{\pi}{4}D^2 L\left[1 + \dfrac{PD}{4tE}(5 + 4v)\right]$

3. ✘ $\dfrac{\pi}{4}D^2 L$

4. ✘ $\dfrac{\pi}{4}D^2 L\left[\dfrac{PD}{4tE}(5 - 4v)\right]$

5. ✘ $\dfrac{\pi}{4}D^2 L\left[1 + \dfrac{PD}{4tE}(1 - v)\right]$

Question Number : 38 Question Id : 3475353889 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Shearing stress produced on the surface of a solid shaft of diameter (d_0) is τ. The shear stress produced on the surface of hollow shaft of same material, subjected to same torque, and having the outer diameter d_0 and internal diameter xd_0 is given as: [where, $x < 1$]

Options :

1. ✔ $\dfrac{\tau}{1 - x^4}$

2. ✘ $(1 - x^4)\tau$

3. ✘ $(1 - x^2)\tau$

4. ✘ $\dfrac{\tau}{1 - x^2}$

5. ✘ $\dfrac{\tau}{1 - 2x^4}$

Question Number : 39 Question Id : 3475353890 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following does not represents the higher pair?

Options :

1. ✘ Wheel rolling on a surface

2. ✘ Sphere rolling on a surface

3. ✖ Ball bearing

4. ✔ Turning nut on screw

5. ✖ Cylinder rolling on a surface

Question Number : 40 Question Id : 3475353891 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If four links are connected at a joint, it may be treated as:

Options :

1. ✖ 1 binary joint

2. ✖ 2 binary joint

3. ✔ 3 binary joint

4. ✖ 4 binary joint

5. ✖ 5 binary joint

Question Number : 41 Question Id : 3475353892 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is not the shape of Cam?

Options :

1. ✖ Spiral

2. ✔ Knife-edge

3. ✖ Globoidal

4. ✖ Conjugate

5. ✖ Spherical

Question Number : 42 Question Id : 3475353893 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following gears are used between parallel shafts?

Options :

1. ✖ Straight Bevel gears

2. ✖ Spiral Bevel gears

3. ✖ Worm & worm gears

4. ✔ Herringbone gears

5. ✖ Hypoid gears

Question Number : 43 Question Id : 3475353894 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Module of the gear is expressed as:

Options :

1. ✖ Pitch diameter in millimeter

2. ✔ $\dfrac{\text{Pitch diameter in millimeter}}{\text{Number of teeth}}$

3. ✖ $\dfrac{\pi \times (\text{Pitch diameter in millimeter})}{\text{Number of teeth}}$

4. ✖ $\dfrac{\pi \times (\text{Number of teeth})}{\text{Pitch diameter in millimeter}}$

5. ✖ $\dfrac{2 \times (\text{Pitch diameter in millimeter})}{\text{Number of teeth}}$

Question Number : 44 Question Id : 3475353895 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Circular pitch is equal to[d = pitch diameter, T = number of teeth]

Options :

1. ✖ Addendum + dedendum

2. ✖ Addendum − dedendum

3. ✖ Tooth thickness × width of space

4. ✖ Tooth thickness − width of space

5. ✔ πd/T

Question Number : 45 Question Id : 3475353896 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The propeller of an aeroplane is rotating in the clockwise direction when viewed from the rear end. If the plane takes left turn, then the gyroscopic effect causes the:

Options :

1. ✖ nose of the plane to depress and tail of the plane to raise

2. ✔ nose of the plane to raise and tail of the plane to depress

3. ✖ no effect on the nose and tail of the plane

4. ✖ plane to take right turn

5. ✖ speed of the plane will be doubled

Question Number : 46 Question Id : 3475353897 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If X_n = Amplitude at the end of nth oscillation; X_0 = Amplitude at the start of oscillation. Then for underdamped system, which of the following relation is correct? [n = Number of oscillations]

Options :

1. ✖ $\dfrac{X_0}{X_1} = \left(\dfrac{X_0}{X_n}\right)^n$

2. ✖ $\dfrac{X_0}{X_1} = \dfrac{X_0}{X_n}$

3. ✔ $\dfrac{X_0}{X_1} = \left(\dfrac{X_0}{X_n}\right)^{1/n}$

4. ✖ $\dfrac{X_0}{X_1} = \left(\dfrac{X_0}{X_n}\right)^{n+1}$

5. ✖ $\dfrac{X_0}{X_1} = \left(\dfrac{X_0}{X_n}\right)^{n-1}$

Question Number : 47 Question Id : 3475353898 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A flywheel has mass 100 kg and radius of gyration of 0.2 m. The additional amount of energy stored in flywheel, if its speed increases from 30 rad/s to 35 rad/s, will be:

Options :

1. ✖ 65 J

2. ✖ 650 kJ

3. ✔ 650 J

4. ✖ 65 kJ

5. ✖ 65 MJ

Question Number : 48 Question Id : 3475353899 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The height of watt governor is: [g = acceleration due to gravity, ω = angular velocity in rad/s]

Options :

1. ✔ $\dfrac{g}{\omega^2}$

2. ✖ $\dfrac{g}{2\omega^2}$

3. ✖ $\dfrac{g}{4\omega^2}$

4. ✖ $\dfrac{g}{8\omega^2}$

5. ✖ $\dfrac{g}{10\omega^2}$

Question Number : 49 Question Id : 3475353900 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For self locking of the screw, which of the following is correct?

Options :

1. ✔ Coefficient of friction > tangent of helix angle

2. ✖ Coefficient of friction < tangent of helix angle

3. ✖

There is no relation between coefficient of friction and tangent of helix angle for the screw to be self locking

4. ✖ Efficiency of self locking square thread power screw is always greater than 50%

5. ✖ Tangent of helix angle is always zero in self locking screw

Question Number : 50 Question Id : 3475353901 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Failure of the component occurs when the maximum shear stress in the complex system reaches the value of maximum shear stress in simple tension at the elastic limit. This is known as:

Options :

1. ✖ Rankine theory

2. ✔ Guest and Tresca theory

3. ✖ Haigh theory

4. ✖ St. Venant theory

5. ✖ Carnot theory

Question Number : 51 Question Id : 3475353902 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The distance between the edge of the plate to the center line of the rivets in the nearest row is known as:

Options :

1. ✖ Pitch of riveted joint

2. ✔ Margin of riveted joint

3. ✖ Transverse pitch

4. ✖ Diagonal pitch

5. ✖ Circular pitch

Question Number : 52 Question Id : 3475353903 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Caulking and fullering processes are used:

Options :

1. ✖ to lubricate the bearing

2. ✖ to reduce the friction between mating parts of gears

3. ✖ to obtain self locking of screw

4. ✔ to obtain leak proof riveted joint

5. ✖ to cool the bearing

Question Number : 53 Question Id : 3475353904 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A shaft of diameter (d) is subjected to torque (T) and bending moment (M). The value of maximum principal stress and maximum shear stress is given respectively by:

Options :

1. ✔ $\dfrac{16}{\pi d^3}\left[M + \sqrt{M^2 + T^2}\right]$; $\dfrac{16}{\pi d^3}\left[\sqrt{M^2 + T^2}\right]$

2. ✖ $\dfrac{16}{\pi d^4}\left[M + \sqrt{M^2 + T^2}\right]$; $\dfrac{16}{\pi d^4}\left[\sqrt{M^2 + T^2}\right]$

3. ✖ $\dfrac{16}{\pi d^3}\left[\sqrt{M^2 + T^2}\right]$; $\dfrac{16}{\pi d^3}\left[M + \sqrt{M^2 + T^2}\right]$

4. ✖ $\dfrac{16}{\pi d^4}\left[\sqrt{M^2 + T^2}\right]$; $\dfrac{16}{\pi d^4}\left[M + \sqrt{M^2 + T^2}\right]$

5. ✖ $\dfrac{32}{\pi d^4}\left[\sqrt{M^2 + T^2}\right]$; $\dfrac{32}{\pi d^4}\left[M + \sqrt{M^2 + T^2}\right]$

Question Number : 54 Question Id : 3475353905 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A square key is used to transmit the torque (T) from the shaft to the hub. The relationship between induced compressive stress (σ_c) and shear stress (τ) is given by:

Options :

1. ✖ $\sigma = \tau$

2. ✔ $\sigma = 2\tau$

3. ✖ $\sigma = \tau/2$

4. ✖ $\sigma = \tau/4$

5. ✖ $\sigma = \tau/6$

Question Number : 55 Question Id : 3475353906 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is true for bearings?

Options :

1. ✔ In hydrostatic lubricated bearings, externally pressurized lubricant is fed into the bearing

2. ✖ Hydrostatic lubricated bearings require the motion of surfaces to generate the lubricating film

3. ✖ Hydrostatic lubricated bearing can operate at very high speed only

4. ✖ In hydrodynamic lubricated bearings, externally pressurized lubricant is fed into the bearing

5. ✖ Hydrodynamic lubricated bearing can operate at very low speed only

Question Number : 56 Question Id : 3475353907 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For the cone clutches, face width of friction linings is: [where , α = semi cone angle, D = outer diameter of cone , d = inner diameter of cone]

Options :

1. ✖ $\dfrac{D}{\sin \alpha}$

2. ✖ $\dfrac{D-d}{\sin \alpha}$

3. ✖ $\dfrac{D-d}{2}\sin \alpha$

4. ✔ $\dfrac{D-d}{2\sin \alpha}$

5. ✖ $\dfrac{D}{2}\sin \alpha$

Question Number : 57 Question Id : 3475353908 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

"Bearing characteristic number" for sliding contact bearing is given by: [where, μ = viscosity of lubricant, N = speed of journal and P = bearing pressure]

Options :

1. ✖ μNP

2. ✔ $\dfrac{\mu N}{P}$

3. ✖ $\dfrac{\mu}{NP}$

4. ✖ $\dfrac{P}{\mu N}$

5. ✖ $\dfrac{\mu P}{N}$

Question Number : 58 Question Id : 3475353909 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The relationship between the dynamic load carrying capacity (C), equivalent dynamic load (P) and bearing life (L) is given by: [where p = constant and depends upon the type of bearing]

Options :

1. ✖ $L = \left(\dfrac{C}{P}\right)^{1/p}$ in million revolution

2. ✖ $L = \left(\dfrac{P}{C}\right)^{1/p}$ in million revolution

3. ✔ $L = \left(\dfrac{C}{P}\right)^{p}$ in million revolution

4. ✖ $L = \left(\dfrac{P}{C}\right)^{p}$ in million revolution

5. ✖ $L = \left(\dfrac{C}{P}\right)^{2p}$ in million revolution

Question Number : 59 Question Id : 3475353910 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The amount by which diameter of hole is larger than the diameter of shaft is known as:

Options :

1. ✖ Interference

2. ✔ Clearance

3. ✖ Tolerance

4. ✖ Limit

5. ✖ Margin

Question Number : 60 Question Id : 3475353911 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The relationship of tool life and cutting speed is expressed as $VT^n = C$. Which of the following is not true for this relation?

Options :

1. ✔ V = cutting speed (m/min), T = temperature (°C)

2. ✖ V = cutting speed (m/min), T = tool life (min)

3. ✖ Tool life decreases at high cutting speeds

4. ✖ 'C' is numerically equal to the cutting speed that gives tool life of 1 min

5. ✖ It is known as Taylor tool life equation

Question Number : 61 Question Id : 3475353912 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is not the characteristics of cutting tool material?

Options :

1. ✖ High hot hardness

2. ✖ High wear resistance

3. ✖ High toughness

4. ✔ High coefficient of friction at tool chip interface

5. ✖ High thermal conductivity

Question Number : 62 Question Id : 3475353913 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Tool signature single point cutting tool consists of:

Options :

1. ✔ 6 angles and 1 linear dimension

2. ✘ 5 angles and 2 linear dimension

3. ✘ 7 angles only

4. ✘ 8 angles only

5. ✘ 5 angles only

Question Number : 63 Question Id : 3475353914 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Cutting fluid used in machining operation should:

Options :

1. ✘ have high heat absorbing capacity

2. ✔ have low flash point

3. ✘ have good lubricating property

4. ✘ wash-off the chips

5. ✘ be non-toxic

Question Number : 64 Question Id : 3475353915 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is not the feature of carburizing flame?

Options :
1. ✘
Carburizing flame is obtained when an excess amount of acetylene is supplied than what is theoretically required

2. ✘ Carburizing flame has "Intermediate flame feather"

3. ✘ Carburizing flame makes the iron & steel hard and brittle

4. ✔ Carburizing flame has only inner white cone and outer envelope

5. ✘ Carburizing flame has inner cone, intermediate flame feather and outer envelope

Question Number : 65 Question Id : 3475353916 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

"A process of confining the metal in a closed cavity and then forced to flow through the opening of a die" is called:

Options :

1. ✖ Rolling

2. ✖ Welding

3. ✔ Extrusion

4. ✖ Drawing

5. ✖ Soldering

Question Number : 66 Question Id : 3475353917 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

"Sintering" is referred to as:

Options :

1. ✖ mixing of different powders to obtain requisite properties

2. ✖ compression of loose powder

3. ✔ heating of the green compact

4. ✖ cleaning of powder by sieving

5. ✖ cleaning of powder by water

Question Number : 67 Question Id : 3475353918 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

"A reservoir of molten metal provided in the casting so that hot metal can flow back into the mould cavity due to the reduction in volume of metal due to solidification" is known as:

Options :

1. ✖ Sprue

2. ✖ Runner

3. ✔ Riser

4. ✖ Core

5. ✗ Chills

Question Number : 68 Question Id : 3475353919 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Tool vibrates with very high frequency in:

Options :

1. ✗ EDM

2. ✗ ECM

3. ✓ USM

4. ✗ LBM

5. ✗ AJM

Question Number : 69 Question Id : 3475353920 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is correct for the unit of pressure?

Options :

1. ✓ $1 \text{ bar} = 10^5 \text{ N/m}^2 = 10^5 \text{ Pa}$

2. ✗ $1 \text{ bar} = 10^5 \text{ N/mm}^2 = 10^5 \text{ Pa}$

3. ✗ $1 \text{ MPa} = 100 \text{ bar} = 1000 \text{ kN/m}^2$

4. ✗ $1 \text{ MPa} = 10 \text{ bar} = 100 \text{ kN/m}^2$

5. ✗ $1 \text{ bar} = 10^5 \text{ kN/m}^2 = 10^5 \text{ Pa}$

Question Number : 70 Question Id : 3475353921 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A gas expands from its initial condition of pressure 400 kPa and volume of 0.1 m³ to final pressure of 100 kPa through a quasistatic process of PV^2 = constant. The work for the process will be:

Options :

1. ✗ 2 kJ

2. ✓ 20 kJ

3. ✗ 200 kJ

4. ✗ 20 J

5. ✗ 200 J

Question Number : 71 Question Id : 3475353922 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The liquid is referred to as "compressed liquid" when:

Options :

1. ✓ the temperature of liquid is less than saturation temperature at given pressure

2. ✗ the temperature of liquid is greater than saturation temperature at given pressure

3. ✗ the temperature of liquid is equal to saturation temperature at given pressure

4. ✗ the temperature of liquid is equal to critical temperature

5. ✗ it is boiling at atmospheric condition

Question Number : 72 Question Id : 3475353923 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A room of dimension 5m × 5m × 5m contain the air ($R = 0.287 \, kPa.m^3/kg - K$) at 100 kPa and 300 K. The mass of the air in the room will be approximately:

Options :

1. ✗ 14.5 kg

2. ✗ 1.45 kg

3. ✓ 145 kg

4. ✗ 1450 kg

5. ✗ 0.145 kg

Question Number : 73 Question Id : 3475353924 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A reversible power cycle operates between a high reservoir temperature (T) and a low reservoir temperature at 200 K. Cycle develops 30 kW and rejects 600 kJ/min of energy by heat transfer to low temperature reservoir. The temperature of reservoir (T) will be:

Options :

1. ✖ 700 K

2. ✔ 800 K

3. ✖ 900 K

4. ✖ 1000 K

5. ✖ 1100 K

Question Number : 74 Question Id : 3475353925 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A heat source at 1000 K loses 3 MJ of heat to a sink at 500 K. The entropy generation of this heat transfer process will be:

Options :

1. ✖ 3 kJ

2. ✖ 3 J/K

3. ✔ 3 kJ/K

4. ✖ 0.3 kJ/K

5. ✖ 30 kJ/K

Question Number : 75 Question Id : 3475353926 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is incorrect for Rankine vapor power cycle?

Options :

1. ✖ It has two reversible adiabatic and two reversible isobaric process.

2. ✖ Its efficiency is dependent on mean temperature of addition and temperature of heat rejection.

3. ✔ Constant pressure heat rejection takes place in the turbine.

4. ✖ The efficiency of Rankine cycle can be increased by increasing the degree of superheat at constant pressure.

5. ✖ Heat addition takes place in the boiler at constant pressure.

Question Number : 76 Question Id : 3475353927 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If V = volume at TDC and r = compression ratio. Then swept volume will be given by:

Options :

1. ✖ $\dfrac{rV}{(r-1)}$

2. ✖ $\dfrac{(r-1)V}{r}$

3. ✖ Vr

4. ✔ $(r-1)V$

5. ✖ $V(r^2-1)$

Question Number : 77 Question Id : 3475353928 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct : 2 Wrong : 0

The range of A/F ratio for SI engine is:

Options :

1. ✔ 9-18

2. ✖ 1-9

3. ✖ 18-50

4. ✖ 50-100

5. ✖ 20-30

Question Number : 78 Question Id : 3475353929 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct : 2 Wrong : 0

SI engine requires rich mixture during:

Options :

1. ✖ idling and cruising

2. ✔ idling and high power range

3. ✖ cruising only

4. ✖ high power only

5. ✖ idling, cruising and high power range

Question Number : 79 Question Id : 3475353930 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is not the supercharger?

Options :

1. ✖ Root type supercharger

2. ✖ Vane type supercharger

3. ✖ Centrifugal type supercharger

4. ✔ Reciprocating supercharger

5. ✖ Screw type supercharger

Question Number : 80 Question Id : 3475353931 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Flame speed in SI engine increases:

Options :

1. ✔ with increase in compression ratio

2. ✖ with decrease in intake temperature and pressure of the mixture

3. ✖ with decrease in engine speed

4. ✖ with decrease in turbulence in mixture

5. ✖ at very lean mixture

Question Number : 81 Question Id : 3475353932 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A Carnot refrigerator working between 300 K and 250 K has the cooling capacity of 10 TR. Rate of heat rejected to the high temperature reservoir will be:

Options :

1. ✖ 35.1 kW

2. ✖ 7.02 kW

3. ✔ 42.12 kW

4. ✘ 28 kW

5. ✘ 30 kW

Question Number : 82 Question Id : 3475353933 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Refrigerant CF_3Br is designated as:

Options :

1. ✘ R131

2. ✔ R13B1

3. ✘ R23B1

4. ✘ R11B1

5. ✘ R717

Question Number : 83 Question Id : 3475353934 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is the desirable property of refrigerant in vapor compression refrigeration system?

Options :

1. ✘ Low vapor density

2. ✔ Low freezing temperature

3. ✘ Low latent heat of vaporization

4. ✘ Condenser and evaporator pressure should be below atmospheric pressure

5. ✘ GWP and ODP should be high

Question Number : 84 Question Id : 3475353935 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Azeotropes are:

Options :

1. ✘ mixture of refrigerant and lubricating oil

2. ✖ mixture of primary and secondary refrigerant

3. ✔ mixture of refrigerants with unique boiling point

4. ✖ mixture of refrigerant with glide in temperature

5. ✖ mixture of refrigerant of low latent heat of vaporization

Question Number : 85 Question Id : 3475353936 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In vapor absorption refrigeration system, heat input, heat rejection and refrigeration occurs at 400 K, 300 K and 270 K respectively. Ideal COP of the system will be:

Options :

1. ✖ 1.25

2. ✔ 2.25

3. ✖ 3.25

4. ✖ 4.25

5. ✖ 4.75

Question Number : 86 Question Id : 3475353937 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following components of vapor absorption refrigeration system reject heat to the surroundings?

Options :

1. ✖ Generator and condenser

2. ✖ Condenser and evaporator

3. ✖ Absorber and generator

4. ✔ Absorber and condenser

5. ✖ Absorber and evaporator

Question Number : 87 Question Id : 3475353938 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Heat rejection ratio of the condenser is 1.2. The COP of this refrigeration plant will be:

Options :

1. ✖ 3

2. ✖ 4

3. ✔ 5

4. ✖ 6

5. ✖ 2

Question Number : 88 Question Id : 3475353939 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Pull-down period in refrigeration system is:

Options :

1. ✖ the time for which the compressor is not working

2. ✔
the time required to reach the specified temperature inside the cabinet after switching on the unit

3. ✖ the time required for charging the refrigerant in the system

4. ✖ time required to leak the refrigerant from system

5. ✖ time required by the system to consume 1 unit of electricity

Question Number : 89 Question Id : 3475353940 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is a "Dynamic compressor"?

Options :

1. ✔ Centrifugal compressor

2. ✖ Screw compressor

3. ✖ Root blower

4. ✖ Reciprocating compressor

5. ✖ Vane type compressor

Question Number : 90 Question Id : 3475353941 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Saturation temperature of the water vapor in the moist air is known as:

Options :

1. ✖ Dry bulb temperature

2. ✔ Dew point temperature

3. ✖ Wet bulb temperature

4. ✖ Critical temperature

5. ✖ Adiabatic saturation temperature

Question Number : 91 Question Id : 3475353942 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is true for sensible heating process?

Options :

1. ✖ DBT increases, WBT increases, RH increases, Dew point temperature remains same

2. ✖ DBT increases, WBT decreases, RH increases, Dew point temperature increases

3. ✔ DBT increases, WBT increases, RH decreases, Dew point temperature remains same

4. ✖ DBT increases, WBT decreases, RH decreases, Dew point temperature increases

5. ✖ DBT decreases, WBT increases, RH increases, Dew point temperature remains same

Question Number : 92 Question Id : 3475353943 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Index of human comfort is given by:

Options :

1. ✖ Relative humidity

2. ✖ Dry bulb temperature

3. ✖ Air velocity

4. ✔ Effective temperature

5. ✗ Dew point temperature

Question Number : 93 Question Id : 3475353944 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The COP of gas refrigeration cycle: [r = pressure ratio]

Options :

1. ✗ increases with increase in pressure ratio

2. ✓ decreases with increase in pressure ratio

3. ✗ remains constant with increase in pressure ratio

4. ✗ is given by, $COP = \dfrac{1}{(r^{\gamma})-1}$

5. ✗ is given by, $COP = \dfrac{1}{(r^{1/\gamma})-1}$

Question Number : 94 Question Id : 3475353945 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following symbols represents the "operation"?

Options :

1. ✗ □

2. ✗ Δ

3. ✓ ○

4. ✗ ⟹

5. ✗ ▽

Question Number : 95 Question Id : 3475353946 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A company has a monthly demand of 6000 unit. The ordering cost is ₹ 200/order. Inventory carrying cost is 4% of the unit price and unit cost is ₹ 50. The economic order quality will be:

Options :

1. ✗ 3162 unit

2. ✖ 3478 unit

3. ✔ 3795 unit

4. ✖ 4111 unit

5. ✖ 4332 unit

Question Number : 96 Question Id : 3475353947 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The shortest possible time required for completion of an activity, if all goes extremely well is known as:

Options :

1. ✔ Optimistic time

2. ✖ Pessimistic time

3. ✖ Most likely time

4. ✖ Standard time

5. ✖ Delay

Question Number : 97 Question Id : 3475353948 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is incorrect?

Options :

1. ✖ LST = LFT – duration of the activity

2. ✖ EFT = EST + duration of activity

3. ✔ EFT = EST – duration of the activity

4. ✖ Total float of an activity = LST – EST

5. ✖ Total float of an activity = LFT – EFT

Question Number : 98 Question Id : 3475353949 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For an activity t_0 = optimistic time = 2 days, t_m = most likely time = 8 days, t_p = pessimistic time = 14 days. Then expected time (t_e), standard deviation (σ) and variance (v) for the activity will respectively be given by:

Options :

1. ✖ 8, 2, 2

2. ✖ 48, 2, 4

3. ✖ 4, 4, 2

4. ✔ 8, 2, 4

5. ✖ 4, 4, 16

Question Number : 99 Question Id : 3475353950 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The time study of a machine operation recorded the cycle time of 6, 7, 7, 8 minutes. Rating of worker is 90%. The allowance fraction is 0.05. the standard time will be:

Options :

1. ✖ 6.12

2. ✖ 7.33

3. ✔ 6.63

4. ✖ 7.63

5. ✖ 8.12

Question Number : 100 Question Id : 3475353951 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For ABC analysis of inventory control, which of the following is correct?

Options :

1. ✖ Item 'A' are few in numbers and low in cost

2. ✖ Item 'C' are few in numbers and low in cost

3. ✔ Item 'A' are few in numbers and high in cost

4. ✖ Item 'C' are few in numbers and high in cost

5. ✖ Item 'A' are high in numbers and low in cost

Question Number : 101 Question Id : 3475353952 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If F = fixed cost, V = variable cost per unit, P = sale price per unit, then break even quantity will be given by:

Options :

1. ✖ $\dfrac{P}{F-V}$

2. ✖ $\dfrac{V}{F-P}$

3. ✔ $\dfrac{F}{P-V}$

4. ✖ $\dfrac{F-V}{P}$

5. ✖ $\dfrac{F \times V}{P-V}$

Question Number : 102 Question Id : 3475353953 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The design capacity of plant is the production of 10^5 kg of material/day. The effective capacity of the plant is only 7×10^4 kg/day. The actual output is measured to be 6×10^4 kg/day. The efficiency and utilization of the plant will respectively given by:

Options :

1. ✖ 60%; 85.7%

2. ✔ 85.7%; 60%

3. ✖ 85.7%; 87.5%

4. ✖ 60%; 60%

5. ✖ 80%; 87.5%

Question Number : 103 Question Id : 3475353954 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The resistance of a material to elastic deformation is called:

Options :

1. ✖ Ductility

2. ✖ Toughness

3. ✖ Hardness

4. ✔ Stiffness

5. ✖ Hot hardness

Question Number : 104 Question Id : 3475353955 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is not true for **Ferrite**?

Options :

1. ✖ It has BCC structure

2. ✖ It is soft and ductile

3. ✔ Solubility of carbon in ferrite is very high

4. ✖ It is alpha-iron and highly magnetic

5. ✖ It is alpha-iron and non-magnetic

Question Number : 105 Question Id : 3475353956 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The critical load for the column [length = l, flexural rigidity = EI] fixed at one end and free at another end is given as:
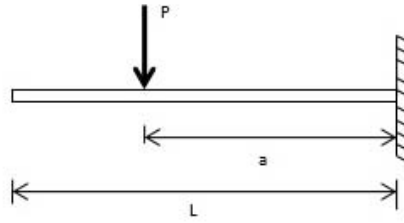
Options :

1. ✔ $\dfrac{\pi^2 EI}{4l^2}$

2. ✖ $\dfrac{\pi^2 EI}{l^2}$

3. ✖ $\dfrac{4\pi^2 EI}{l^2}$

4. ✖ $\dfrac{2.05\,\pi^2 EI}{l^2}$

5. ✖ $\dfrac{\pi^2 EI}{5l^2}$

Question Number : 106 Question Id : 3475353957 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A load P is acting at a distance of 'a' from the fixed end of cantilever beam of length (L), flexural rigidity (EI) as in figure. The deflection of the free end will be:

Options :

1. ✖ $\dfrac{Pa^3}{3EI}$

2. ✖ $\dfrac{PL^3}{3EI}$

3. ✔ $\dfrac{Pa^3}{3EI} + \dfrac{(L-a)Pa^2}{2EI}$

4. ✖ $\dfrac{Pa^3}{3EI} + \dfrac{(L-a)Pa}{3EI}$

5. ✖ $\dfrac{Pa^3}{3EI} + \dfrac{(L-a)Pa^2}{3EI}$

Question Number : 107 Question Id : 3475353958 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A block of mass (m) slides down an inclined plane (coefficient of friction $= \mu$) from the rest as in figure. What will be the velocity of block when it reaches the lowest point of plane?
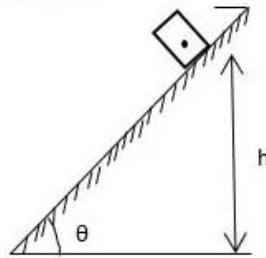
Options :

1. ✖ $2gh(1 - \mu \cot\theta)$

2. ✔ $\sqrt{2gh(1 - \mu \cot\theta)}$
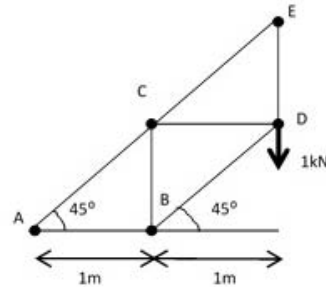
3. ✖ $\sqrt{2gh\mu(1 - \cot\theta)}$

4. ✖ $\sqrt{2gh(1 - \mu \sin\theta)}$

5. $\times$ $\sqrt{2gh(\mu - \tan\theta)}$

Question Number : 108 Question Id : 3475353959 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What will be the axial forces in the member EC, ED and DC of the plane truss (ABCDE) as shown in figure with end 'A' and 'B' is hinged to foundation?

Options :

1. $\times$ FEC = FED = FDC= 0

2. $\times$ FEC = FED = 0; FDC=1 kN(C)

3. $\checkmark$ FEC = FED = 0; FDC= 1 kN(T)

4. $\times$ FEC = FED = FDC = 1 kN(T)

5. $\times$ FEC = FED = FDC = 1 kN(C)

Question Number : 109 Question Id : 3475353960 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Radius of Mohr's circle for strain is given by: [if ε = direct strain and γ = shear strain]

Options :

1. $\times$ $\left\{ \left(\dfrac{\varepsilon_{xx} - \varepsilon_{yy}}{2} \right)^2 + \dfrac{\gamma_{xy}}{2} \right\}$

2. $\checkmark$ $\sqrt{ \left(\dfrac{\varepsilon_{xx} - \varepsilon_{yy}}{2} \right)^2 + \left(\dfrac{\gamma_{xy}}{2} \right)^2 }$

3. $\times$ $\sqrt{ \left(\dfrac{\varepsilon_{xx} - \varepsilon_{yy}}{2} \right)^2 + \left(\gamma_{xy} \right)^2 }$

$$4. \times \sqrt{\left(\frac{\varepsilon_{xx} + \varepsilon_{yy}}{2}\right)^2 + \left(\frac{\gamma_{xy}}{2}\right)^2}$$

$$5. \times \sqrt{\left(\frac{\varepsilon_{xx} + \varepsilon_{yy}}{2}\right)^2 + (\gamma_{xy})^2}$$

Question Number : 110 Question Id : 3475353961 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What will be the speed ratio of the pulley due to creep, if stress-strain curve for belt is assumed to be parabolic? [where, N_1 = speed of driving pulley, N_2 = speed of driven pulley, σ_1 & σ_2 = stress on tight and slack side of belt respectively, E = Modulus of elasticity of belt, D_1 & D_2 = diameter of driving and driven pulley respectively]

Options :

$$1. \times \quad \frac{N_2}{N_1} = \frac{D_1}{D_2} \times \left[\frac{E + \sigma_2}{E + \sigma_1}\right]$$

$$2. \checkmark \quad \frac{N_2}{N_1} = \frac{D_1}{D_2} \times \left[\frac{E + \sqrt{\sigma_2}}{E + \sqrt{\sigma_1}}\right]$$

$$3. \times \quad \frac{N_2}{N_1} = \frac{D_1}{D_2} \times \left[\frac{E - \sqrt{\sigma_2}}{E - \sqrt{\sigma_1}}\right]$$

$$4. \times \quad \frac{N_2}{N_1} = \frac{D_1}{D_2} \times \left[\frac{E - \sigma_2}{E - \sigma_1}\right]$$

$$5. \times \quad \frac{N_2}{N_1} = \frac{D_1}{D_2} \times \left[\sqrt{\frac{E - \sigma_2}{E - \sigma_1}}\right]$$

Question Number : 111 Question Id : 3475353962 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The maximum efficiency of worm and worm wheel is: [Coefficient of friction $= \mu$]

Options :

$$1. \times \quad \frac{1}{1 + \sin(\tan^{-1}\mu)}$$

$$2. \checkmark \quad \frac{1 - \sin(\tan^{-1}\mu)}{1 + \sin(\tan^{-1}\mu)}$$

3. ✖ $\dfrac{1}{1+\tan(\sin^{-1}\mu)}$

4. ✖ $\dfrac{1}{1+\mu}$

5. ✖ $1-\sin(\tan^{-1}\mu)$

Question Number : 112 Question Id : 3475353963 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The ratio of tension on slack side to the tension on tight side after n blocks for band and block brakes is given as:

[when, μ = Coefficient of friction, 2θ = Angle subtended by each block at the center, n = Number of blocks]

Options :

1. ✔ $\left(\dfrac{1-\mu\tan\theta}{1+\mu\tan\theta}\right)^{n}$

2. ✖ $\left(\dfrac{1+\mu\tan\theta}{1-\mu\tan\theta}\right)^{n}$

3. ✖ $\left(\dfrac{1-\mu\tan\theta}{1+\mu\tan\theta}\right)^{n+1}$
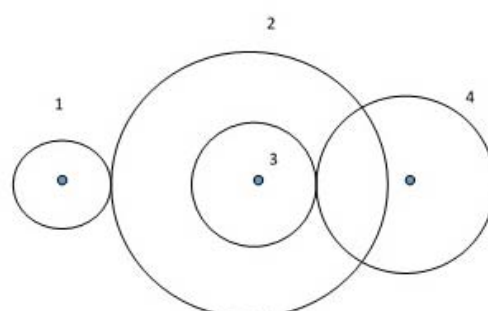
4. ✖ $\left(\dfrac{1+\mu\tan\theta}{1-\mu\tan\theta}\right)^{n+1}$

5. ✖ $\left(\dfrac{1+\mu\cos\theta}{1-\mu\cos\theta}\right)^{n+1}$

Question Number : 113 Question Id : 3475353964 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A compound gear train is shown in figure. The power is transmitted from the shaft of gear 1 to the shaft of gear 4 with intermediate shaft having gear 2 and gear 3. The speed ratio will be: [Number of teeth on gears 1, 2, 3, 4 are 10, 80, 30, 60 respectively]

Options :

1. ✖ 4

2. ✖ 8

3. ✖ 12

4. ✔ 16

5. ✖ 20

Question Number : 114 Question Id : 3475353965 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The angular acceleration of rotating shaft is given by: [ω = Angular velocity of shaft about horizontal axis, $\frac{d\theta}{dt}$ = Angular velocity of precession]

Options :

1. ✖ $\omega - \dfrac{d\theta}{dt}$

2. ✖ $\omega + \dfrac{d\theta}{dt}$

3. ✖ $\omega \div \dfrac{d\theta}{dt}$

4. ✔ $\omega \times \dfrac{d\theta}{dt}$

5. ✖ zero

Question Number : 115 Question Id : 3475353966 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The effort required at the mean radius to raise the load (W) in square threaded screw is given as: [r_m = mean radius, α = helix angle, ϕ = friction angle]

Options :

1. ✔ $W \tan(\alpha + \phi)$

2. ✖ $W r_m \tan(\alpha + \phi)$

3. ✖ $W r_m \tan(\alpha - \phi)$

4. ✖ $\dfrac{W}{\pi r_m \tan(\alpha + \phi)}$

5. ✖ $\dfrac{W r_m \tan(\alpha + \phi)}{\tan \alpha}$

Question Number : 116 Question Id : 3475353967 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The frictional force and frictional torque acting on the drum of centrifugal clutch by each shoe is given as: [ω_1 = engagement speed (rad/s), ω_2 = running speed (rad/s), m = mass of each shoe, R = Radius of drum, r = Radius of center of gravity of shoe]

Options :

1. ✖ $\mu m R(\omega_2^2 - \omega_1^2); \mu m R r(\omega_2^2 - \omega_1^2)$

2. ✖ $\mu m \dfrac{R^2}{r}(\omega_2^2 - \omega_1^2); \mu m R^2(\omega_2^2 - \omega_1^2)$

3. ✔ $\mu m r(\omega_2^2 - \omega_1^2); \mu m R r(\omega_2^2 - \omega_1^2)$

4. ✖ $\mu m r(\omega_2^2 - \omega_1^2); \mu m r^2(\omega_2^2 - \omega_1^2)$

5. ✖ $\mu m R(\omega_2^2 - \omega_1^2); \mu m R^2(\omega_2^2 - \omega_1^2)$

Question Number : 117 Question Id : 3475353968 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The angle through which the brake drum rotates during the braking period is 20 radians and the energy absorbed by the brakes is 100 kJ. The braking torque capacity is:

Options :

1. ✖ 2×10^6 Nm

2. ✖ 5×10^3 N/m

3. ✔ 5×10^3 Nm

4. ✖ 2×10^6 N/m

5. ✖ 50 kN.m

Question Number : 118 Question Id : 3475353969 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is the condition of maximum power transmission for belt? [T = Maximum permissible tension in belt, T_c = Centrifugal tension, V_{max} = velocity at maximum power transmission, m = mass/length of belt]

Options :

1. ✖ $T = 3T_c; V_{max} = \dfrac{T}{3m}$

2. ✔ $T = 3T_c; V_{max} = \sqrt{\dfrac{T}{3m}}$

3. ✖ $T_c = 3T; V_{max} = \sqrt{\dfrac{T}{3m}}$

4. ✖ $T_c = 2T; V_{max} = \dfrac{T}{3m}$

5. ✖ $T = T_c; V_{max} = \dfrac{T}{m}$

Question Number : 119 Question Id : 3475353970 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Notch sensitivity varies between:

Options :

1. ✖ $0 - 10$

2. ✖ $0.1 - 100$

3. ✖ $1 - 100$

4. ✔ $0 - 1$

5. ✖ $0 - 0.1$

Question Number : 120 Question Id : 3475353971 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Tensile strength of the plates for Butt joint is: [σ =Permissible tensile stress, t = Thickness of plate, l = Length of weld, η = Efficiency of joint]

Options :

1. ✖ $\dfrac{\sigma t l}{\eta}$

2. ✔ $\sigma t l \eta$

3. ✘ $\dfrac{\sigma t l \eta}{2}$

4. ✘ $\dfrac{\sigma t l}{2\eta}$

5. ✘ $\dfrac{\sigma t^2 l}{2\eta}$

Question Number : 121 Question Id : 3475353972 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A single acting reciprocating pump of piston area of cross-section 0.05 m^2 and strokes of 0.4 m is running at 60 rpm and delivers 19 liter/s of water. The percentage slip of pump will be:

Options :

1. ✘ 3%

2. ✘ 4%

3. ✔ 5%

4. ✘ 6%

5. ✘ 7%

Question Number : 122 Question Id : 3475353973 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is correct for centrifugal pumps?

Options :

1. ✔
Constant efficiency curve is obtained by using manometric head versus discharge curve for different speed and overall efficiency versus discharge curve for different speed

2. ✘
Constant efficiency curve is obtained by using input power versus discharge curve for different speed and overall efficiency versus discharge curve for different speed

3. ✘
Constant efficiency curve is obtained by combining input power versus discharge curve for different speed and head versus discharge curve for different speed

4. ✘
For pumps connected in series, the total discharge capacity will be the sum of individual discharge capacity

5. ✖
For pumps connected in parallel, the total head developed will be the sum of individual head developed by each pump

Question Number : 123 Question Id : 3475353974 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The maximum hydraulic efficiency of Pelton turbine and ratio of the velocity of jet to the velocity of bucket at this efficiency will be respectively: [Neglecting the bucket friction]

Options :

1. ✖ $(1 + \cos \phi); 2$

2. ✖ $\left(\dfrac{1 + \cos \phi}{2} \right); 0.5$

3. ✖ $(1 - \cos \phi); 0.5$

4. ✖ $(1 - \cos \phi); 0.2$

5. ✔ $\left(\dfrac{1 + \cos \phi}{2} \right); 2$

Question Number : 124 Question Id : 3475353975 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is true for steam turbines?

Options :

1. ✖ In reaction turbine, gradual pressure drop takes place over fixed blades only

2. ✖ In reaction turbine, gradual pressure drop takes place over moving blades only

3. ✖ In impulse turbine, pressure drop takes place in nozzle as well as in the blades

4. ✖ In impulse turbine, pressure drop takes place in nozzle, and increases in the blades

5. ✔ In reaction turbine, gradual pressure drop takes place in moving as well as in fixed blades

Question Number : 125 Question Id : 3475353976 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In a gas turbine plant, compressor power, turbine power and heat input are respectively given as 300 kJ/kg, 500 kJ/kg and 700 kJ/kg. The thermal efficiency and back work ratio of the plant will be:

Options :

1. ✖ 71.4%; 0.4

2. ✗ 42.8%; 0.6

3. ✗ 71.4%; 0.6

4. ✗ 28.6%; 0.4

5. ✓ 28.6%; 0.6

Question Number : 126 Question Id : 3475353977 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A square plate (2m × 2m) lies in water such that its plane makes an angle of 30° with free surface of water and one edge of the plate coincide with the free surface. The total pressure force and center of pressure is:

Options :

1. ✗ 9.81 kN; 0.666 m

2. ✗ 19.62 kN; 0.166 m

3. ✗ 9.81 kN; 0.166 m

4. ✗ 19.62 kN; 0.566 m

5. ✓ 19.62 kN; 0.666 m

Question Number : 127 Question Id : 3475353978 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Three dimensional flow field is described by

$$V = (y^2 + z^2)\hat{\imath} + (x^2 + z^2)\hat{\jmath} + (x^2 + y^2)\hat{k}$$

The component of rotation at(1, 2, 3) is given as:

Options :

1. ✓ $\omega_x = -1, \omega_y = 2, \omega_z = -1$

2. ✗ $\omega_x = -1, \omega_y = -2, \omega_z = 1$

3. ✗ $\omega_x = -1, \omega_y = -2, \omega_z = -1$

4. ✗ $\omega_x = 1, \omega_y = 2, \omega_z = -1$

5. ✗ $\omega_x = 1, \omega_y = -2, \omega_z = -1$

Question Number : 128 Question Id : 3475353979 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is correct for venturimeter?

Options :

1. ✖ It is used to measure the velocity of the flow

2. ✔

The difference of pressure head at section 1 and 2 is given by, $x \left[\frac{S_m}{S} - 1\right]$

Where, x = difference in level of manometric head between two limbs of U-tube manometer, S_m = specific gravity of manometric fluid, and S = specific gravity of flowing fluid ($S_m > S$)

3. ✖ Its convergent cone has included angle less than that of divergent cone

4. ✖ The length of convergent cone is larger than that of divergent cone

Actual discharge through venturimeter is, $Q_a = \dfrac{C_d a_1 a_2 \sqrt{2gh}}{\sqrt{a_1^3 - a_2^3}}$

5. ✖

Question Number : 129 Question Id : 3475353980 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Time required to empty a tank from height h_1 to h_2 for rectangular notch is: [A = cross sectional area of reservoir, C_d = coefficient of discharge, L = length of crest of notch]

Options :

1. ✖ $\dfrac{A}{C_d L \sqrt{2g}} \left[\dfrac{1}{h_2} - \dfrac{1}{h_1}\right]$

2. ✖ $\dfrac{3A}{C_d L \sqrt{2g}} \left[\dfrac{1}{h_2^{3/2}} - \dfrac{1}{h_1^{3/2}}\right]$

3. ✖ $\dfrac{5A}{C_d L \sqrt{2g}} \left[\dfrac{1}{\sqrt{h_2}} - \dfrac{1}{\sqrt{h_1}}\right]$

4. ✔ $\dfrac{3A}{C_d L \sqrt{2g}} \left[\dfrac{1}{\sqrt{h_2}} - \dfrac{1}{\sqrt{h_1}}\right]$

5. ✖ $\dfrac{A}{C_d L \sqrt{2g}} \left[\dfrac{1}{\sqrt{h_2}} - \dfrac{1}{\sqrt{h_1}}\right]$

Question Number : 130 Question Id : 3475353981 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The pressure difference in a turbulent flow through the pipe of diameter (D) and length (L) depends on velocity, viscosity, density and roughness. The number of π- terms formed will be:

Options :

1. ✖ 2

2. ✖ 3

3. ✔ 4

4. ✖ 5

5. ✖ 6

Question Number : 131 Question Id : 3475353982 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The intensity of the radiation emitted by the sun is maximum at a wavelength of 0.5 μm. Assuming the sun to a black body, the surface temperature of the sun will approximately be:

Options :

1. ✖ 5000 K

2. ✔ 5780 K

3. ✖ 6280 K

4. ✖ 6490 K

5. ✖ 6600 K

Question Number : 132 Question Id : 3475353983 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The unit of fouling factor is:

Options :

1. ✖ W/m^2-K

2. ✖ m-K/W

3. ✖ K/W

4. ✖ m^2/K

5. ✔ $m^2 \text{-} K/W$

Question Number : 133 Question Id : 3475353984 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For steady, 1-D conduction, with no heat generation temperature distribution in the cylinder along the radius is: [T = temperature, r = radius, i = inside, o = outside]

Options :

1. ✖ $\dfrac{T(r) - T_i}{T_o - T_i} = \dfrac{\ln r}{\ln r_i}$

2. ✖ $\dfrac{T(r) - T_i}{T_o - T_i} = \dfrac{\ln r}{\ln r_o}$

3. ✖ $\dfrac{T - T_i}{T_o - T_i} = \dfrac{\ln(r/r_o)}{\ln(r/r_i)}$

4. ✔ $\dfrac{T(r) - T_i}{T_o - T_i} = \dfrac{\ln(r/r_i)}{\ln(r_o/r_i)}$

5. ✖ $\dfrac{T(r) - T_i}{T_o - T_i} = \dfrac{r}{r_i}$

Question Number : 134 Question Id : 3475353985 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The Stanton number (St) is:

Options :

1. ✖ $\dfrac{Nu}{Re\sqrt{Pr}}$

2. ✖ $\dfrac{Nu}{Pr\sqrt{Re}}$

3. ✖ $\dfrac{\sqrt{Nu}}{Pr.Re}$

4. ✖ $\dfrac{Nu}{Re(\sqrt[a]{Pr})}$

5. ✔ $\dfrac{Nu}{Pr.Re}$

Question Number : 135 Question Id : 3475353986 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is 'HCFC' refrigerant?

Options :

1. ✖ R11

2. ✖ R290

3. ✖ R12

4. ✖ R717

5. ✔ R22

Question Number : 136 Question Id : 3475353987 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Coefficient of performance (COP) of vapor compression refrigeration system: [T_e = evaporator temperature, T_c = condenser temperature]

Options :

1. ✖ increases with increase in T_c at constant T_e

2. ✖ increases with decrease in T_e at constant T_c

3. ✔ increases with increase in T_e at constant T_c

4. ✖ does not change with variation of T_e at constant T_c

5. ✖ does not change with variation of T_c at constant T_e

Question Number : 137 Question Id : 3475353988 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A vapor absorption refrigeration system with COP of 0.8 and refrigeration capacity of 1 kW. The heat input at generator (Q_g) and summation of heat rejected at absorber & condenser ($Q_a + c$) is given as:

Options :

1. ✖ $Q_g = 1.25 \text{ kW}; Q_a + c = 1.25 \text{ kW}$

2. ✗ $Q_g = 1.25\,\text{kW}; Q_a + c = 1\,\text{kW}$

3. ✗ $Q_g = 0.8\,\text{kW}; Q_a + c = 1.8\,\text{kW}$

4. ✗ $Q_g = 0.8\,\text{kW}; Q_a + c = 1\,\text{kW}$

5. ✓ $Q_g = 1.25\,\text{kW}; Q_a + c = 2.25\,\text{kW}$

Question Number : 138 Question Id : 3475353989 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is correct for capillary tube used in vapor compression refrigeration system?

Options :

1. ✗ It is very expensive

2. ✗ It requires high maintenance

3. ✓ The starting torque requirement of the motor of the compressor is low

4. ✗ Its bore is large

5. ✗ It is not used with hermetically sealed compressor

Question Number : 139 Question Id : 3475353990 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Heat is transferred at the rate of $\dot{Q}$ from the hot reservoir at absolute temperature (T_1) to the cold reservoir at absolute temperature (T_2). The rate of entropy generation will be:

Options :

1. ✗ $\dot{Q}\dfrac{T_1}{T_2}$

2. ✗ $\dot{Q}\dfrac{T_2}{T_1}$

3. ✗ $\dot{Q}\left(\dfrac{T_1 - T_2}{T_1}\right)$

4. ✗ $\dot{Q}\left(\dfrac{T_1 - T_2}{T_2}\right)$

5. ✔ $\dot{Q}\left(\dfrac{T_1 - T_2}{T_1 T_2}\right)$

Question Number : 140 Question Id : 3475353991 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is incorrect?

Options :

1. ✖ Heat is a path function

2. ✖ Work is a path function

3. ✖ Heat is transferred due to temperature difference only

4. ✔ Work is transferred due to temperature difference only

5. ✖ Temperature is a point function

Question Number : 141 Question Id : 3475353992 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Gas turbine cycle with regeneration refers to:

Options :

1. ✔ Preheating of the air leaving the compressor with the help of turbine exhaust gases

2. ✖ Precooling of the air leaving the compressor with the help of cold water

3. ✖ Heating the exhaust gases between two turbines

4. ✖ Intercooling the air between two compressors

5. ✖ Cooling of the exhaust gases between two turbines

Question Number : 142 Question Id : 3475353993 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

For polytropic process ($Pv^n = constant$), the value of 'n' between two states (1 and 2) is given as:

Options :

1. ✖ $n = \dfrac{\ln(P_1 P_2)}{\ln(v_1 v_2)}$

2. ✖ $n = \dfrac{\ln(P_1/P_2)}{\ln(v_1/v_2)}$

3. ✖ $n = \dfrac{\ln(P_1 + P_2)}{\ln(v_1 + v_2)}$

4. ✖ $n = \dfrac{\ln(P_1 - P_2)}{\ln(v_1 - v_2)}$

5. ✔ $n = \dfrac{\ln(P_1/P_2)}{\ln(v_2/v_1)}$

Question Number : 143 Question Id : 3475353994 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following relation is correct for orthogonal cutting? [where, r = chip thickness ratio, α = rake angle, ϕ = shear angle]

Options :

1. ✖ $\tan \phi = \dfrac{\cos \alpha}{1 - r \cos \alpha}$

2. ✖ $\tan \phi = \dfrac{r \sin \alpha}{1 - r \cos \alpha}$

3. ✔ $\tan \phi = \dfrac{r \cos \alpha}{1 - r \sin \alpha}$

4. ✖ $\tan \phi = \dfrac{r \sin \alpha}{1 - r \sin \alpha}$

5. ✖ $\tan \phi = \dfrac{r}{1 - r \sin \alpha}$

Question Number : 144 Question Id : 3475353995 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Tool dynamometers are used to:

Options :

1. ✖ determine the tool angle

2. ✖ determine the tool hardness

3. ✖ determine the tool nose radius

4. ✔ determine the cutting forces

5. ✖ determine the tool material composition

Question Number : 145 Question Id : 3475353996 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The edge length of an FCC unit cell of atomic radius R is given by:

Options :

1. ✔ $2\sqrt{2}R$

2. ✖ $2R$

3. ✖ $\sqrt{2}R$

4. ✖ $3R$

5. ✖ $3\sqrt{2}R$

Question Number : 146 Question Id : 3475353997 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is not the unconventional machining process?

Options :

1. ✖ EDM

2. ✖ ECM

3. ✖ USM

4. ✖ LBM

5. ✔ Turning

Question Number : 147 Question Id : 3475353998 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A manufacturer has to supply 9,000 unit of product/per. The cost of one procurement is ₹ 10 and holding cost per unit is ₹ 2 per year. The replacement is instantaneous and no shortages are allowed. Number of orders per year will be:

Options :

1. ✖ 10

2. ✖ 20

3. ✔ 30

4. ✖ 40

5. ✖ 50

Question Number : 148 Question Id : 3475353999 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A project is expected to take 12 days along the critical path, having the standard deviation of 4 days.

Probability factor(z)	Probability (%)
−0.5	30.85
1	84.13
−1	15.87
0	50
3	99.87

The probability of completion of project in 16 days will be: [use the table of probability factor and probability]

Options :

1. ✖ 30.85%

2. ✔ 84.13%

3. ✖ 15.87%

4. ✖ 50%

5. ✖ 99.87%

Question Number : 149 Question Id : 3475354000 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The fixed cost per month is ₹ 5,000, variable cost is ₹ 2 per unit, selling price is ₹ 7 per unit. To achieve a profit of ₹ 1,000, the quantity produced per month will be:

Options :

1. ✖ 800

2. ✖ 1000

3. ✔ 1200

4. ✖ 1400

5. ✖ 1600

Question Number : 150 Question Id : 3475354001 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In ABC analysis:

Options :

1. ✖ item 'A' is large in number

2. ✖ item 'B' is very expensive item

3. ✖ item 'C' is very few in numbers

4. ✔ item 'C' is low valued items

5. ✖ item 'A' is low valued items