
Que. 1 In an Otto cycle, the compression ratio is 9:1 and the pressure and temperature at the beginning of the compression process are 100 kPa and 10°C. The heat addition by combustion gives the highest temperature as 2500 K. Specific heat added by combustion is:

1. 0.762 MJ/kg
2. 1.305 MJ/kg
3. 0.286 MJ/kg
4. 1.048 MJ/kg

Que. 2 If a Carnot refrigerator and a Carnot heat pump are operating between the same two thermal reservoirs, and the COP of the refrigerator is 2.5, then COP of the heat pump will be:

1. 4.5
2. 1.5
3. 2.5
4. 3.5

Que. 3 Saturated water vapour at 200 kPa is in a constant pressure piston/cylinder assembly. At this state the piston is 0.1 m from the cylinder bottom. If the temperature is changed to 200°C, how much is this distance?

1. 0.0122 m
2. 12.20 m
3. 0.1220 m
4. 1.220 m

Que. 4 Select the thermodynamic defect from the options given below:

1. Line defect
2. Point defect
3. Area defect
4. Volume defect

Que. 5 A metal rod has a diameter of 8 mm and a true stress-strain relationship is given by $\sigma = 900 \times \epsilon^{0.6}$ is under the action of tensile loading. The minimum diameter in mm that can be achieved is:

1. 8.54
2. 4.76
3. 5.92
4. 3.87

Que. 6 Steam at 4 MPa and 673 K enter a nozzle steadily with a velocity of 60 m/s and it leaves at 2 MPa and 573 K. The inlet area of the nozzle is 50 cm², and heat is being lost from the nozzle at a rate of 75 kJ/s.

Exit velocity in m/s is given by:

1. 62.425
2. 58.899
3. 624.25
4. 581.723

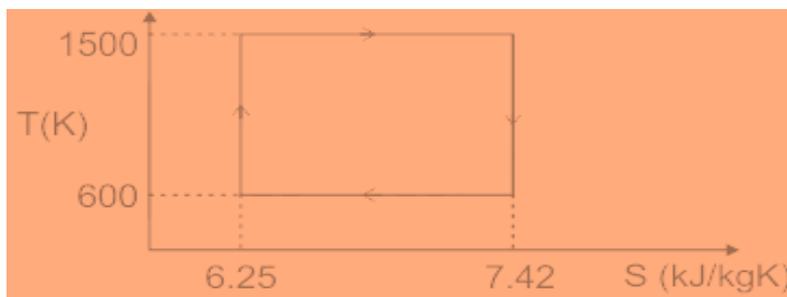
Que. 7 A gas goes through a process given by $pv^2 = c$. It expands from state 1 of 350 kPa and 0.049 m³ to a final pressure of 150 kPa. Work delivered during this process in kJ is:

1. 4.765
2. 8.5
3. 5.915
4. 3.897

Que. 8 Pick the correct statement about pure substance.

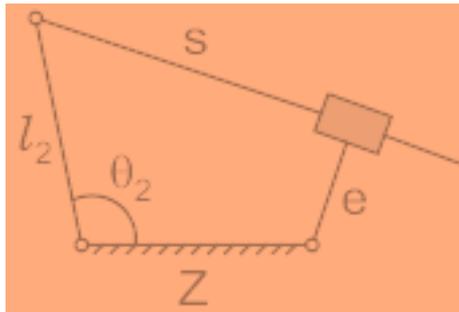
1. A mixture of liquid air and gaseous air is a pure substance.
2. A mixture of ice and liquid water is not a pure substance.
3. A mixture of two or more phases of pure substance is not a pure substance even though the chemical composition of all the phases is the same throughout
4. A mixture of two or more phases of pure substance is still a pure substance as long as the chemical composition of all the phases is the same throughout

Que. 9 For the following T-s diagram pick the correct option.



1. This represents a heat engine with cycle efficiency = 0.6; net work = 1053 kJ/kg.
2. This represents a heat pump with COP = 0.6; net work = 1237 kJ/kg.
3. This represents a heat engine with cycle efficiency = 0.4; net work = 1053 kJ/kg.
4. This represents a refrigerator with COP = 0.4; net work = 702 kJ/kg.

Que. 10 The inversion of a slider-crank mechanism is shown in the figure. The properties are $l_1 = 10$ cm, $l_2 = 4$ cm and $e = 3$ cm. when $\theta_2 = 90^\circ$, then the value of "s" in cm is:



1. 11.9
2. 11.6
3. 9.5
4. 10.34

Que. 11 In a transportation problem with 4 supply points and 5 demand points, how many number of constraints are required in its formulation?

1. 20
2. 1
3. 0
4. 9

Que. 12 DOF of an over-constrained structure has _____ value.

1. zero
2. positive. or negative
3. negative
4. positive

Que. 13 The diameter of an optimum cylindrical riser (height = diameter) attached to the side of a steel plate casting having dimensions of 25 cm x 12.5 cm x 5 cm, by assuming that volumetric shrinkage of solidification is 3% for steel and that the volume of the riser is 3 times that by the shrinkage considerations alone, will be:

1. 8.32 cm
2. 7.26 cm
3. 3.24 cm
4. 5.64 cm

Que. 14 An ice plant is to be maintained at 270 K. The ambient temperature is 300 K. If 5×10^6 kJ/h of energy is to be continuously removed from the ice plant, the minimum power required to run the refrigerator will be:

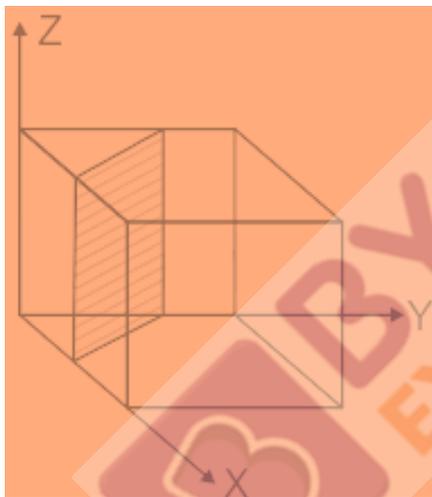
1. 126.2 kW

2. 77.15 kW
3. 254.4 kW
4. 154.3 kW

Que. 15 In a shaping process, the cutting velocity is provided to

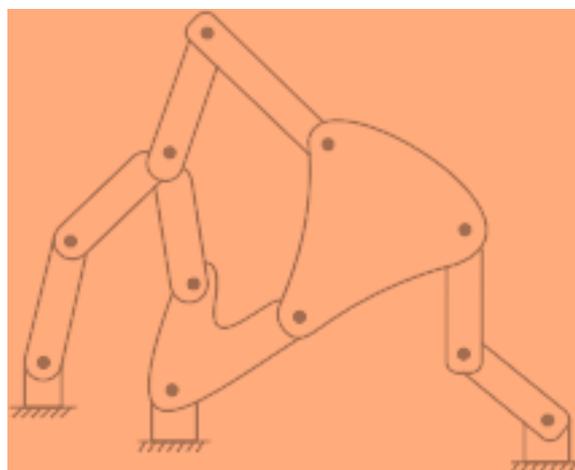
1. neither work piece nor cutting tool
2. work piece and cutting tool
3. cutting tool
4. work piece

Que. 16 The Miller indices for the plane in the figure shown below are:



1. [120]
2. [210]
3. [220]
4. [002]

Que. 17 A mechanism is shown below. The number of tertiary links and the DOF, respectively are:



1. 2 : 3
2. 2 : 2
3. 3 : 2
4. 3 : 3

Que. 18 The stress experienced by a material is _____ than the engineering stress at a given load.

1. Lower
2. Higher
3. Equal
4. Higher or Lower

Que. 19 Which term of the following is defined by the first law of thermodynamics?

1. Kinetic energy
2. Temperature
3. Potential energy
4. Total energy

Que. 20 For a given design of bucket, if 'u' is the velocity of the bucket and ' V_1 ' is the velocity of the jet, then the ratio ' u/V_1 ' for the efficiency of a Pelton wheel is theoretically maximum:

1. 0.75
2. 0.25
3. 0.5
4. 1

Que. 21 A copper bar of diameter 200 mm is turned with a feed rate of 0.25 mm/rev with depth of cut of 4 mm. Spindle speed is 160 rpm. The material removal rate (MRR) in mm^3/s is :

1. 150
2. 167.55
3. 1500
4. 1675.5

Que. 22 Stream line, path line and streak line are identical when the

1. Flow is steady
2. Flow is uniform
3. Flow velocities do not change steadily with time
4. Flow is neither steady nor uniform

Que. 23 Consider the Linear Programming problem:

Maximize: $7X_1 + 6X_2 + 4X_3$

subject to:

$$X_1 + X_2 + X_3 \leq 5;$$

$$2X_1 + X_2 + 3X_3 \leq 10,$$

$X_1, X_2, X_3 \geq 0$ (Solve by algebraic method).

The number of basic solutions is:

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

Que. 24 If the total acceleration of fluid flow is always zero, then it is:

1. unsteady and uniform flow
2. steady and uniform flow
3. steady but non-uniform flow
4. unsteady and non-uniform flow

Que. 25 A disc clutch is required to transmit 5 kW at 2000 rpm. The disc has a friction lining with the coefficient of friction 0.25. The bore radius of the friction lining is 25 mm. Assume uniform contact pressure of 1 MPa. The value of outside radius of the friction lining in mm is:

1. 59.3
2. 39.4
3. 29.6
4. 49.5

Que. 26 What is the lowest pressure at which water can exist in liquid phase in stable equilibrium?

1. 101.325 kPa
2. 0.311 kPa
3. 22.06 kPa
4. 0.611 kPa

Que. 27 A two-dimensional flow field has velocities along the x and y directions given by $u = x^2t$ and $v = -2xyt$ respectively, where t is time. The equation of streamlines is:

1. $x^2y = \text{constant}$
2. $xy^2 = \text{constant}$
3. $xy = \text{constant}$
4. Not possible to determine

Que. 28 While cooling, a cubical casting of side 40 mm undergoes 3%, 4% and 5% volume shrinkage during the liquid state, phase transition and solid state, respectively. The volume of metal compensated from the riser is

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

Que. 29 A 4-stroke 4-cylinder reciprocating engine has cylinder diameter of 4 cm, stroke length of 7 cm and clearance volume 2 cm^3 . The engine capacity in cc is:

1. 110
2. 252
3. 400
4. 352

Que. 30 During an experiment on a 4-stroke SI engine, it was observed that the maximum and minimum pressure inside the cylinder during each working cycle was 5 bar and 200 bar respectively. If the compression ratio was 8, then the mean effective pressure is approximately:

1. 1.28 bar
2. 18.02 bar
3. 2.18 bar
4. 21.80 bar

Que. 31 'A fluid is at rest' means that

1. it has zero normal stress and non-zero shear stress
2. it has non-zero normal stress and zero shear stress
3. it has non-zero normal stress and shear stress
4. it has zero normal stress and zero shear stress

Que. 32 A spherical steel pressure vessel 400 mm in diameter with a wall thickness of 20 mm, is coated with a brittle layer that cracks when strain exceeds 100×10^{-7} . What internal pressure will cause the layer to develop cracks? ($E = 200 \text{ GPa}$, $\mu = 0.3$)

1. 0.057 MPa
 2. 5.7 MPa
 3. 0.57 MPa
 4. 57 MPa
-

Que. 33 The piezometric head in a static liquid:

1. remains constant only in a horizontal plane
2. remains constant at all points in the liquid
3. decreases linearly with depth below a free surface
4. increases linearly with depth below a free surface

Que. 34 Pick the correct statement about viscosity.

1. In general, it decreases with temperature for liquids because the internal force of attraction between two fluid layers gets decreased.
2. In general, it decreases with temperature for gases because the internal force of attraction between two fluid layers gets decreased.
3. In general, it increases with temperature for liquids because the internal force of attraction between two fluid layers gets increased.
4. In general, it increases with temperature for gases because the internal force of attraction between two fluid layers gets increased.

Que. 35 In a welding process, the welding parameters used are: welding current = 250 A, welding voltage = 25 V and welding traverse speed = 6 mm/s. Find welding power.

1. 6.55 kW
2. 65.5 kW
3. 62.5 kW
4. 6.25 kW

Que. 36 The optimum intermediate pressure P_2 in a two-stage air compressor having $P_1 = 4$ bar and $P_3 = 9$ bar, as suction and delivery pressures respectively, is equal to:

1. 13 bar
2. 9 bar
3. 4 bar
4. 6 bar

Que. 37 Fourier's law of heat conduction defines the rate of heat transfer through a body as

1. only dependent upon the material of the body
2. proportional to the area normal to the direction of the heat flow and the temperature gradient along the direction of the heat flow, and is dependent upon the material of the body
3. proportional only to the area normal to the direction of the heat flow
4. proportional only to the temperature gradient along the direction of the heat flow

Que. 38

A pump works on the principle of centrifugal theory, running at 900 rpm is working against a head of 16 m. The external diameter of the impeller is 360 mm and the outlet width is 40 mm. If the vane angle at the outlet is 30° and the manometric efficiency is 80%, the discharge of the pump will be:

1. $0.22 \text{ m}^3/\text{s}$
2. $0.24 \text{ m}^3/\text{s}$
3. $0.18 \text{ m}^3/\text{s}$
4. $0.14 \text{ m}^3/\text{s}$

Que. 39 The angle of the divergent portion of a venturimeter is less than the angle of the converging portion

1. increase to velocity of flow in the direction of flow at the diverging part
2. avoid the situation where flow may become compressible
3. minimize the loss of energy due to flow separation
4. decrease the pressure in the direction of flow at diverging part

Que. 40 The pressure inside a balloon is proportional to the square of its diameter. It contains 2 kg of water at 150 kPa with 85% quality. The balloon and water are now heated so that a final pressure of 600 kPa is reached. The process undergone by the water is given by p-v equation as:

1. $PV^{-\frac{2}{3}} = \text{constant}$
2. $PV^{\frac{2}{3}} = \text{constant}$
3. $PV^{\frac{2}{5}} = \text{constant}$
4. $PV^{-\frac{2}{5}} = \text{constant}$

Que. 41 In an Otto cycle, the compression ratio is 9 : 1 and the pressure and temperature at the beginning of the compression process are 100 kPa and 10°C . The heat addition by combustion gives the highest temperature as 2500 K. Thermal efficiency of the cycle is:

1. 68.47%
2. 48.57%
3. 38.47%
4. 58.47%

Que. 42 An IC engine produces an indicated power of 12 kW. If the mechanical efficiency of the engine is 90%, then loss of power due to friction is given as:

1. 1.2 kW
2. 2.2 kW
3. 3.2 kW
4. 0.2 kW

Que. 43 A copper rod with initial length l_0 is pulled by a force. The instantaneous length of the rod is given by $l = l_0 (1 + 2e^{4t})$ where t represents time. True strain rate at $t = 0$ is:

1. $\frac{1}{3}$
2. $\frac{8}{3}$
3. $\frac{4}{3}$
4. $\frac{2}{3}$

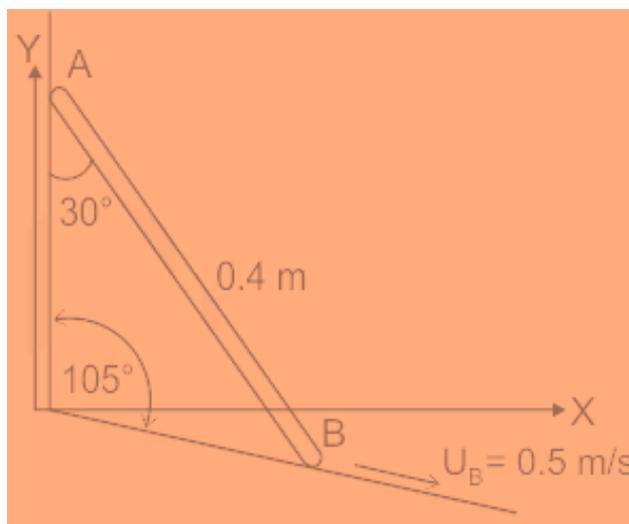
Que. 44 The state of stress at a point in a 2-D loading is such that the Mohr's circle is a point located at 175 MPa on the positive normal stress axis. The maximum and minimum principal stresses respectively, from Mohr's circle, are:

1. 0; 0 MPa
2. + 175 MPa; + 175 MPa
3. + 175 MPa; - 175 MPa
4. + 175 MPa; 0 MPa

Que. 45 A radial load of 6.5 kN is applied on a cylindrical roller bearing. The desired life of the bearing with 90% reliability is 18000 hours with the application factor 1.7. if the shaft rotates at 1600 rpm, then the required basic dynamic load rating for the bearing is given by:

1. 103.4 MN
2. 103.4 kN
3. 1.042 kN
4. 10.34 kN

Que. 46 The angular velocity of the slender bar AB (see figure below) is _____ rad/s.



1. 1.39
2. 1.65
3. 1.56
4. 1.85

Que. 47 A fan supplies 250 CFM air flow rate. It is equal to ___ m³/s.

1. 0.095
2. 0.118
3. 0.127
4. 0.175

Que. 48 In a gating system design, a down sprue of 180 mm length has a diameter of 20 mm at its top end. The liquid metal in the pouring cup is maintained up to 60 mm height. The diameter (in mm) of the down sprue at its lower end to avoid aspiration will be:

1. 11.11
2. 14.14
3. 25
4. 17.32

Que. 49 An electric flat-plate square heater of sides 10 cm provides 100 W power from each side. If the heater is assumed to be black, its temperature is approximately:

1. 648°C
2. 648 K
3. 6480°C
4. 6480 K

Que. 50 In an Otto cycle, the compression ratio is 9 : 1, and the pressure and temperature at the beginning of the compression process are 100 kPa and 10° C respectively. The heat addition by combustion gives the highest temperature as 2500 K. The highest cycle pressure is:

1. 7.95 MPa
2. 2.17 MPa
3. 1.39 MPa
4. 8.50 MPa

Que. 51 An I.C engine having 6 cylinders, works on Otto-cycle. It has a bore of 20 cm and a stroke of 40 cm. If the clearance volume is 9000 cm³, the compression ratio is:

1. 10.03
2. 8.53
3. 9.38
4. 7.33

Que. 52 A DC welding power source has a linear voltage-Current (V-I) characteristic with an open-circuit voltage of 80 Volt and a short circuit current of 300 A. For maximum arc power, the Current (in Amperes) should be set as

1. 1200 A
2. 150 A
3. 1500 A
4. 120 A

Que. 53 A spring is made of a wire of 2 mm diameter having a shear modulus of 80 GPa. The mean coil diameter is 20 mm and the number of active coils is 10. If the mean coil diameter is reduced to 10 mm, the stiffness of the spring is:

1. Increased by 16 times
2. Decreased by 8 times
3. Increased by 8 times
4. Decreased by 16 times

Que. 54 Which condition is non favorable for continuous chips?

1. Low feed and depth of cut
2. Brittle workpiece
3. High speed
4. High Back rake angle

Que. 55 For steady state one-dimensional heat conduction through a plane wall with constant thermal conductivity and no internal heat generation, the temperature distribution within the wall will be:

1. hyperbolic
2. elliptic
3. linear
4. non-linear

Que. 56 Two helical springs of the same material and of equal circular cross-section and length and the number of turns, but having radii 20 mm and 40 mm, kept concentrically (smaller radius spring within the larger radius spring), are compressed between two parallel planes with a load P. The inner spring will carry a load equal to:

1. $\frac{8P}{9}$
2. $\frac{P}{3}$
3. $\frac{P}{2}$
4. $\frac{P}{9}$

Que. 57 A block is of dimensions of the upper surface 100 mm x 100 mm. The height of the block is 10 mm. A tangential force of 10 kN is applied at the centre of the upper surface. The block is displaced by 1 mm with respect to the lower face. Direct shear stress in the element is:

1. 10 MPa
2. 1 MPa
3. 0.1 MPa
4. 100 MPa

Que. 58 Euler's equation of motion is a statement of

1. linear momentum conservation for the flow of an inviscid fluid
2. mass conservation
3. energy conservation
4. linear momentum conservation for a real fluid

Que. 59 A heat engine receives 1 kW of heat transfer at 1200 K and gives out 600 W as work, with the rest as heat transfer to the ambient at 300 K. The second-law efficiency of the engine is:

1. 70%
2. 90%
3. 80%
4. 60%

Que. 60 Number of components (C), phases (P) and degrees of freedom (F) are related by Gibbs phase rule as

1. $C - P - F = 2$
2. $F - C - P = 2$
3. $C + F - P = 2$
4. $P + F - C = 2$

Que. 61 Which of the following options can always be approximated to be an ideal gas -

1. Highly superheated vapour
2. Dry saturated vapour
3. Super critical fluid
4. Saturated vapour

Que. 62 Using Taylor's tool life $VT^{0.5} = C$, the tool life is calculated. Now cutting speed is halved, the percentage increase in the tool life is -

1. 300%

2. 50%
3. 200%
4. 75%

Que. 63 Top down manufacturing approaches are also known as _____ manufacturing.

1. center-out
2. mixed
3. additive
4. subtractive

Que. 64 After which point of the Stress-Strain Diagram does metal cutting start ?

1. Proportional point
2. Ultimate point
3. Fracture point
4. Yield point

Que. 65 A composite wall of surface area 1 m^2 has three layers of thickness 0.3 m, 0.2 m, and 0.1 m and has thermal conductivities 0.6, 0.4, and $0.1 \text{ W/m}^\circ\text{C}$, respectively. There is no generation of thermal energy within the wall. If the inner and outer temperatures of the composite wall are 1840°C and 340°C , respectively, the rate of heat transfer through this wall is:

1. 0.75 kW
2. 0.150 kW
3. 7.5 kW
4. 1.5 kW

Que. 66 For a given amount of heat transfer rate during steady state one-dimensional heat conduction through a plane wall – with constant thermal conductivity and no internal heat generation – the higher the value of thermal conductivity of the wall, the temperature gradient within the wall will be:

1. higher
2. lower
3. same
4. dependent on ambient conditions

Que. 67 Which mechanical property gets affected in an alloy, when it is in over-aged condition:

1. lower hardness
2. low strain hardening rate
3. higher yield strength

4. higher tensile strength

Que. 68 The slenderness ratio of a 4 m column with fixed ends having a square cross-sectional area of side 40 mm is:

1. 173
2. 17.3
3. 1.73
4. 100

Que. 69 The manufacturer has marking on a grinding wheel as 'A 36 L 5 V'. The code 'V' represents the:

1. grade
2. structure
3. abrasive particle size
4. bond

Que. 70 A welded steel cylindrical drum made of a 10 mm thick plate has an internal diameter of 1.20 m. Find the change in diameter that would be caused by internal pressure of 1.5 MPa. Assume that Poisson's ratio is 0.30 and $E = 200 \text{ GPa}$ (longitudinal stress, $\sigma_y = pD/4t$ circumferential stress, $\sigma_x = pD/2t$).

1. 4.590 mm
2. 0.459 mm
3. 45.90 mm
4. 0.0459 mm

Que. 71 A large power generating unit uses a hydraulic turbine to generate 300 kW at 1000 rpm under a head of 40 m. For initial testing, a 1 : 4 scale model of the turbine operates under a head of 10 m. The power generated by the model (in kW) will be

1. 234
2. 2.34
3. 23.4
4. 0.234

Que. 72 In a casting process, a mould of dimension 60 cm x 30 cm x 14 cm is to be filled by liquid metal using the top pouring method. The liquid metal height above the top surface of the mould is 14 cm and the area of the gate is 6 cm^2 . The time taken to fill the mould will be:

1. 32 s
2. 12 s
3. 25.34 s
4. 28.28 s

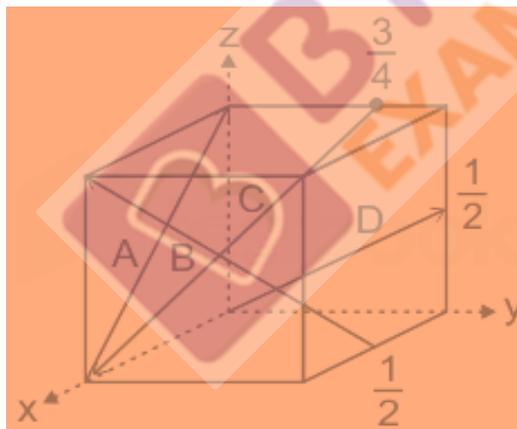
Que. 73 If the outlet angle of the bucket for Pelton wheel is 60° , the maximum efficiency in the case of Pelton wheel neglecting friction in the bucket is:

1. 75%
2. 80%
3. 50%
4. 90%

Que. 74 If the current at 100 % duty cycle is 250 A, then what should the required current be, for 50% duty cycle?

1. 353.55 A
2. 335.55 A
3. 315.55 A
4. 325.55 A

Que. 75 In the figure shown below, Miller indices $[0\ 2\ 1]$ have the direction of



1. B
2. A
3. D
4. C

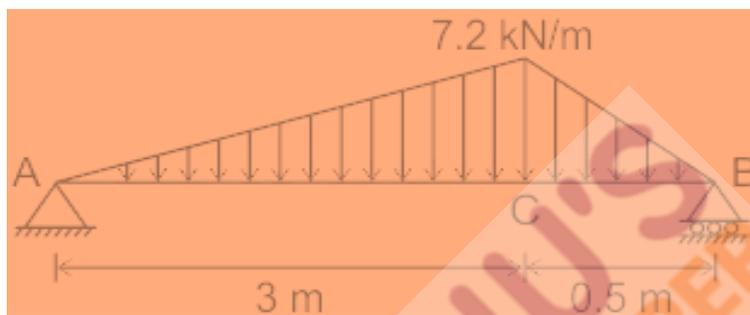
Que. 76 A 50 mm diameter solid shaft is subjected to both, a bending moment and torque of 300 kN-mm & 200 kN-mm respectively. The maximum shear stress induced in the shaft is:

1. 10.22 MPa
 2. 14.69 MPa
 3. 146.9 MPa
 4. 102.2 MPa
-

Que. 77 What is the natural frequency of a cylinder having mass 7 kg and radius 22 cm that is connected to a spring of stiffness 6 kN/m at the center of the cylinder and rolls on a rough surface?

1. 2.4 Hz
2. 4.8 Hz
3. 6.4 Hz
4. 3.8 Hz

Que. 78 A simply supported beam of length 3.5 m carries a triangular load as shown in the figure below. Maximum load intensity is 7.2 kN/m. The location of zero shear stress from point A is:



1. 3 m
2. 1.5 m
3. 2 m
4. 2.5 m

Que. 79 If the total welding cycle time is 10 min, dwell time is 4 min and arcing time is 5 min, then the duty cycle of the welding machine as per the American standard is:

1. 55%
2. 50%
3. 45%
4. 40%

Que. 80 The ratio of moment carrying capacity of a square cross-section beam of dimension D to the moment carrying capacity of a circular cross-section of diameter D is:

1. $\frac{16}{3\pi}$
2. $\frac{16}{\pi}$
3. $\frac{16}{5\pi}$
4. $\frac{8}{3}$

Que. 81 Which of the given statements is true?

1. At the critical point, all the three phases of Water coexist in equilibrium
2. At the critical point, saturated liquid and saturated vapour phases are identical

3. At the triple point, all the three phases of Water coexist in non-equilibrium
4. At the triple point, saturated liquid and saturated vapour phases are identical

Que. 82 An I.C engine works with a compression ratio of 16. If cut-off happens at 8% of the stroke, then the cut-off ratio of this engine is:

1. 1.2
2. 2.2
3. 4.2
4. 3.2

Que. 83 For a long slender column of uniform cross section, the ratio of critical buckling load for the case with both ends hinged to the case with both ends clamped is

1. 0.25
2. 4.0
3. 0.125
4. 0.5

Que. 84 Pick the correct statement about mechanical pressure on fluid element.

1. It is a first order tensor and depends upon the orientation of the surface upon which it *acts*.
2. It is a zero order tensor and does not depend upon the orientation of the surface upon which it acts.
3. It is a zero order tensor and depends upon the orientation of the surface upon which it acts.
4. It is a first order tensor and does not depend upon the orientation of the surface upon which it acts.

Que. 85 Which material removal process is also known as advanced material removal process?

1. Bulk-machining process
2. Primitive casting process
3. Traditional
4. Non-traditional

Que. 86 The ratio of surface energy term to volume energy term in the nucleation energy equation at critical condition during the solidification process is:

1. $-1/2$
 2. $-3/2$
 3. -1
 4. $-2/3$
-

Que. 87 A wave of radiation falls on a body, 35% of the radiation is reflected back. If transmissivity of the body is 0.25, then emissivity is:

1. 0.35
2. 0.45
3. 0.40
4. 0.25

Que. 88 The below figure shows a multi-tube manometer using water and mercury that is used to measure the pressure of air in a vessel. It is given that $h_1 = 0.4$ m, $h_2 = 0.5$ m, $h_3 = 0.3$ m, $h_4 = 0.7$ m, $h_5 = 0.1$ m and $h_6 = 0.5$ m. Assuming the density of water to be 1000 kg/m^3 & the density of mercury to be 13600 kg/m^3 , for the given values of heights, the gauge pressure in kN/m^2 will be:



1. 90
2. 1900
3. 19
4. 190

Que. 89 In an experiment for the evaluation of a cutting tool life using the Taylor's tool life equation, $VT^n = C$, the value of $n = 0.5$. The tool life has a life of 180 minutes at a cutting speed of 18 m/min. If the tool life is reduced to 45 minutes, then the cutting speed in m/min will be:

1. 36
2. 32
3. 40
4. 26

Que. 90 The functional relation between time t in (sec) and distance x , in (m), is $t = 2x^2 + 5x$. The acceleration in m/s^2 at $t = 12$ sec is:

1. $\frac{-1}{121}$
2. $\frac{-4}{1331}$

3. $\frac{-4}{121}$
4. $\frac{4}{1331}$

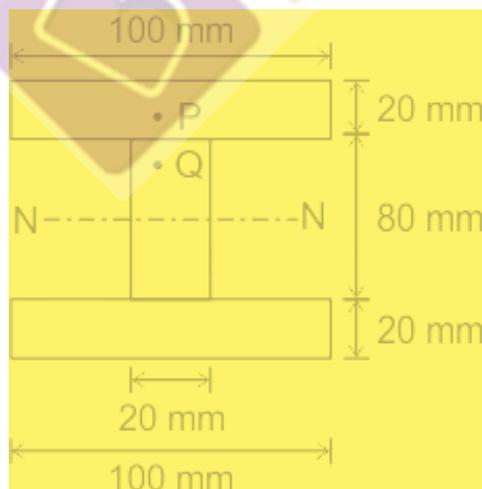
Que. 91 A Pelton wheel operates under a head of 900 m. The speed ratio of the wheel is 0.45. The peripheral speed of the turbine wheel is:

1. 60 m/s
2. 45 m/s
3. 75 m/s
4. 90 m/s

Que. 92 Maximum shear stress developed on the surface of a solid circular shaft under pure torsion is 160 MPa. If the shaft diameter is doubled, then the maximum shear stress developed corresponding to the same torque will be:

1. 10 MPa
2. 30 MPa
3. 40 MPa
4. 20 MPa

Que. 93 An I-section of a beam is shown in the figure below. If the shear stress at point P which is very close to the bottom of the flange is 12 MPa, the shear stress at the point Q close to the flange is:



1. 40 Mpa
2. 12 Mpa
3. Indeterminate
4. 60 MPa

Que. 94 If the surface tension of the soap bubble is 0.035 N/m, then the work done in blowing the soap bubble of radius 5 cm in the air is.

1. 220 mJ

2. 2.2 mJ
3. 22 mJ
4. 0.22 mJ

Que. 95 The physical signification of thermal diffusivity is

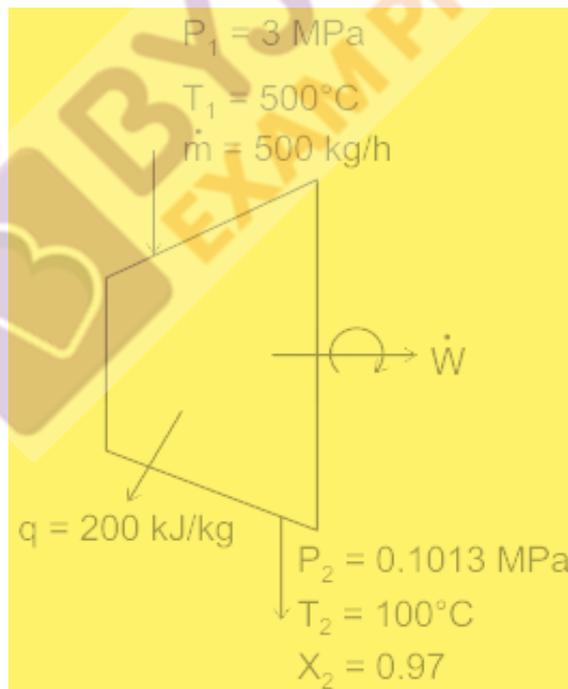
1. The ability of a substance to conduct heat relative to its ability to store thermal energy
2. The ability of a substance to store thermal energy
3. The ratio of the rate of diffusion of momentum through substance to the diffusion of heat in that substance
4. The ability of a substance to conduct heat

Que. 96 Steam flows through a turbine as shown in the figure. The walls of the turbine are not insulated so that there is heat transfer through the walls as shown. The properties of steam are as given below:

$P = 3 \text{ MPa}$, $T = 500^\circ\text{C}$ ($h = 3456.48 \text{ kJ/kg}$, $s = 7.2337 \text{ kJ/kg-K}$)

$P = 0.1013 \text{ MPa}$, $T = 100^\circ\text{C}$ ($h_f = 491.1 \text{ kJ/kg}$, $h_g = 2676 \text{ kJ/kg}$)

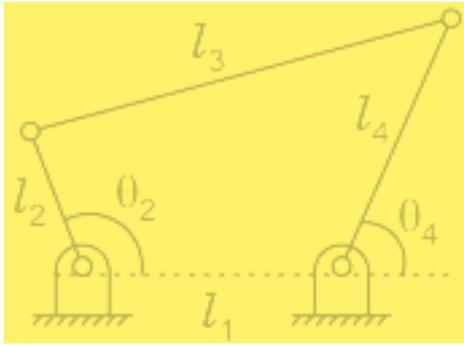
The power output from the turbine in kW is:



1. 150.26
2. 175.87
3. 90.03
4. 125.76

Que. 97 The figure shown below has the following details:

$l_1 = 3 \text{ cm}$, $l_2 = 1.5 \text{ cm}$, $l_3 = 3.5 \text{ cm}$, $l_4 = 4 \text{ cm}$. The value for θ_4 (in degrees), When the input link (l_2) becomes perpendicular to the fixed link for the given assembly mode will be:



1. 45
2. 97.44
3. 65.34
4. 79.44

Que. 98 If the COP of a Carnot refrigerator is 6, then the ratio of higher temperature to lower is:

1. 6 : 1
2. 3 : 2
3. 4 : 3
4. 7 : 6

Que. 99 Chance of occurrence of cavitation are high if the

1. Local pressure becomes very high
2. Local pressure falls below the vapour pressure
3. Thoma cavitation parameter exceeds a certain limit
4. Local temperature becomes low

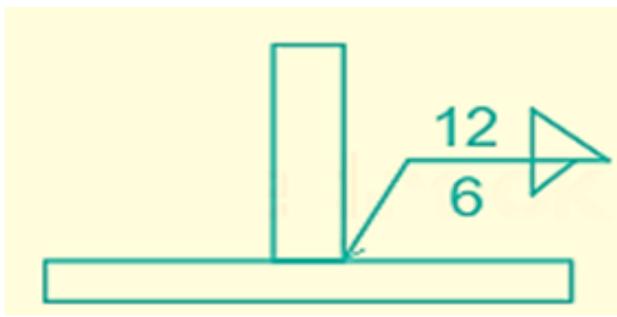
Que. 100 A ball bearing operating at a load F has 8000 hours of life. The life of the bearing, in hours, when the load is doubled to $2F$ is

1. 8000
2. 6000
3. 4000
4. 1000

Que. 101 The primary shear zone during metal machining lies between the:

1. cutting Tool & metal dust
2. cutting tool & metal workpiece
3. metal chip & cutting tool
4. metal work-piece & metal chip

Que. 102 In the below figure shown for a fillet weld, the given numbers represent:



1. 12 mm leg length on arrow side; 6 mm leg length on other side
2. 6 mm leg length on arrow side; 12 mm leg length on other side
3. 6 mm leg length on arrow side; 12 mm leg length arrow on side
4. 6 mm leg length on other side; 12 mm leg length on arrow side

Que. 103 Conduction takes place due to temperature gradients

1. in a medium which is not vacuum
2. in a fluid medium only
3. in solid only
4. only in stationary medium

Que. 104 For a vibrating system, the successive amplitudes of vibration obtained under free effects are 0.70, 0.28, 0.25, 0.23, and 0.067 respectively. The value of the damping ratio of the system is given by:

1. 9.28
2. 0.0928
3. 0.00928
4. 0.928

Que. 105 The following data was observed for a CI engine: Fuel-air ratio: 0.04, Volumetric efficiency: 85%, Indicated mean effective pressure: 8 bar, Fuel calorific value: 44000 kJ/kg, Density of air: 1 kg/m³. What is the indicated thermal efficiency of this engine?

1. 43%
2. 64%
3. 53%
4. 69%

Que. 106 Pick the correct statement about the bulk modulus of elasticity:

1. it is a dimensionless number
2. it is independent of pressure and viscosity
3. it is larger if fluid is more compressible
4. it is higher if the fluid is less compressible

Que. 107 Lathe machine cannot carry out

1. facing
2. planing
3. turning
4. drilling

Que. 108 A room window (consisting of a vertical sheet of plane glass) is exposed to direct sunshine at a strength of 1000 W/m^2 . The window is pointing due south, while the sun is in the southwest, 30° above the horizon. Estimate the amount of solar energy in W/m^2 reflected by the window. Assume glass to be gray with $\rho(\text{reflectivity}) = 0.08$.

1. 49
2. 490
3. 612.4
4. 61.2

Que. 109 A fluid near a solid wall has an approximated velocity profile given by $u(y) = U_\infty \times \sin\left(\frac{\pi y}{2\delta}\right)$, $0 \leq y \leq \delta$. The walls shear stress is given by:

1. $\tau_{wall} = \frac{\pi\mu U_\infty}{2\delta}$
2. $\tau_{wall} = \frac{3\pi\mu U_\infty}{\delta}$
3. $\tau_{wall} = \frac{2\pi\mu U_\infty}{\delta}$
4. $\tau_{wall} = \frac{\pi\mu U_\infty}{\delta}$

Que. 110 5 kg steam expands in a piston-cylinder device from a pressure of 5 bar and 700°C ($h = 3925.97 \text{ kJ/kg}$, $s = 8.5892 \text{ kJ/kg.K}$, $u = 3477.52 \text{ kJ/kg}$) to a pressure and temperature of 3 bar and 600°C ($h = 3703.20 \text{ kJ/kg}$, $s = 8.5892 \text{ kJ/kg.K}$, $u = 3300.79 \text{ kJ/kg}$). If the process is reversible and adiabatic, the total work (kJ) for the process will be:

1. 883.65
2. 88.365
3. 558.8
4. 55.88

Que. 111 Consider steady-state heat conduction across the thickness in a plane wall of thickness 0.6 m. The wall has a normal area 1.5 m^2 and is made up of material of thermal conductivity $0.4 \text{ W/m}^\circ\text{C}$. There is no generation of thermal energy within the wall. The temperatures on the two sides are 800°C and 300°C . The thermal resistance of the wall is:

1. $1.5 \text{ W}^\circ\text{C}$
2. $1 \text{ W}^\circ\text{C}$
3. $1.5 \text{ }^\circ\text{C/W}$

4. $1\text{ }^{\circ}\text{C/W}$

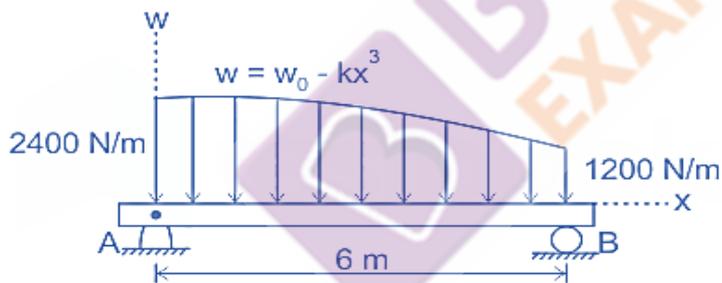
Que. 112 A solid circular shaft of length 4 m is to transmit 3.5 MW at 200 rpm. If permissible shear stress is 50 MPa, the radius of the shaft is:

1. 1.286 mm
2. 12.86 mm
3. 0.1286 mm
4. 128.6 mm

Que. 113 According to Chvorinov's rule, the solidification time of casting is proportional to $(\text{Volume}/\text{surface area})^n$. The value of the exponent 'n' for metal is equal to:

1. 2
2. 3
3. 2.5
4. 1.5

Que. 114 A Beam is subjected to a variable loading as shown in the figure below. The reaction at point B in kN is:



1. 6.84
2. 7.56
3. 5.76
4. 8.64

Que. 115 Which explanation is true for the mechanical pressure (p_m) and thermodynamic pressure (p_{th}) ?

1. A pressure sensor records p_{th} . However, for most of the practical engineering cases, the system at the intermediate states of a process gets enough opportunity to attain equilibrium. Thus, both p_{th} and p_m are equivalent in these cases.
2. p_{th} is the average mechanical pressure exerted at a point in the fluid but p_m is defined as the force exerted on container walls as fluid molecules coincide with it during their random movement.
3. A p_m is a variable quantity and it depends upon the coordinate system used.

4. A pressure sensor records p_{th} . However, for most of the practical engineering cases, the system at the intermediate states of a process does not get enough opportunity to attain equilibrium. Thus, both p_{th} and p_m are equivalent in these cases.

Que. 116 A centrifugal pump runs at the speed of 1450 rpm and discharges $0.118 \text{ m}^3/\text{s}$ of water. The pump works against the head of 25 m. The impeller radius is 12.5 cm, its width at the outlet is 5 cm and manometric efficiency is 75%. The vane angle in degrees at the outer periphery of the impeller is:.

1. 79.77
2. 39.77
3. 49.77
4. 59.77

Que. 117 A cubic wooden block of edge 100 mm and weight 1 kN is sliding down on an inclined plane of inclination 30° with the horizontal. A Newtonian fluid with the viscosity 0.2 Ns/m^2 is layered on the inclined plane. If the thickness of the layer is 0.02 mm, then the terminal velocity of the block in m/s.

1. 0.25
2. 2.5
3. 5
4. 0.5

Que. 118 Pick the correct statement regarding path function.

1. The differentials of point functions are inexact differentials
2. The differentials of point functions & path functions are exact differentials.
3. The differentials of path functions are inexact differentials
4. The differentials of path functions are exact differentials

Que. 119 A non-flow device compresses air isothermally at a temperature of 500°C from a pressure of 5 MPa to a final pressure of 15 MPa. If the device uses 200 kJ/kg of work input, then this process is:

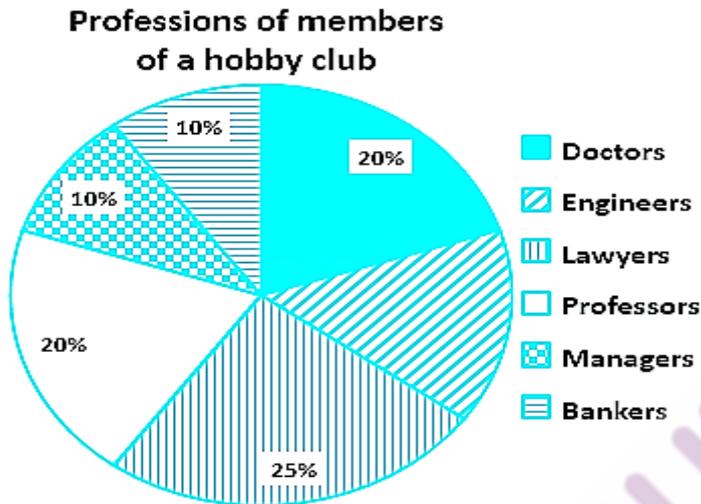
1. Impossible
2. irreversible
3. either reversible or irreversible
4. reversible

Que. 120 An ic engine has a bore and a stroke length of 4 cm each. The total surface area through which heat transfer takes place in cm^2 is.

1. 18π
2. 24π

3. 28π
4. 8π

Que. 121 The pie-chart below shows the professions of 300 members of a hobby club, Study the given information and answer the question that follow.



What is the total number of doctors and engineers put together?

1. 45
2. 90
3. 75
4. 105

Que. 122 Select the term that is related to term 3 in the same way as term 2 is related to term 1.
Acoustics : Sound : Nautics : ?

1. Light
2. Clouds
3. Navigation
4. Altitude

Que. 123 Which one of the pairs of words given in the options shares the same relation as the pair given below does?

EYE : CATARACT

1. KIDNEY : GLAUCOMA
2. STOMACH : LARYNGITIS
3. LUNG : ASTHMA
4. PANCREAS : WART

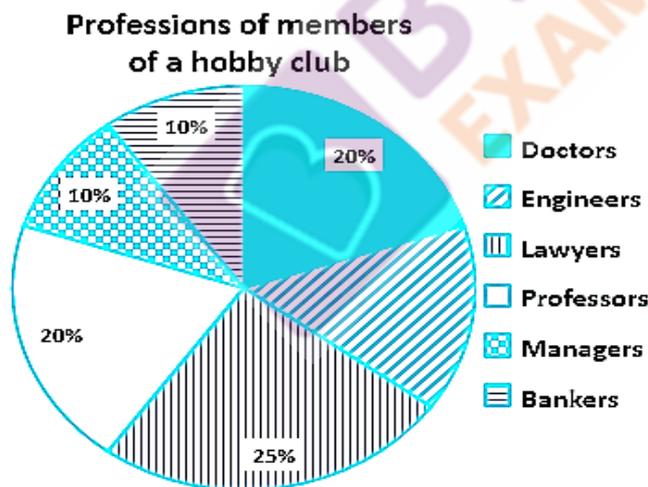
Que. 124 Naveen runs a tea stall. Every day, he buys 10 litre of milk at the rate of Rs. 55 per litre. He spends Rs. 85 on tea leaves, Rs. 75 on sugar, and Rs. 35 on cooking gas. With all these ingredients, he makes and sells 100 cups of tea. Additionally, Naveen spends 55 paise per disposable glass to serve the tea. At what price should he sell each cup of tea to earn a profit of 50% on the entire transaction?

1. Rs. 16
2. Rs. 10
3. Rs. 12
4. Rs. 15

Que. 125 The sum of three consecutive even numbers is 150. Which one of the following numbers is NOT one of those three numbers?

1. 52
2. 48
3. 54
4. 50

Que. 126 The pie-chart below shows the professions of 300 members of a hobby club, Study the given information and answer the question that follow.



How many members are doctors?

1. 60
2. 75
3. 30
4. 45

Que. 127 Consider the given statement and decide which of the given assumptions is/are implicit in the statement,

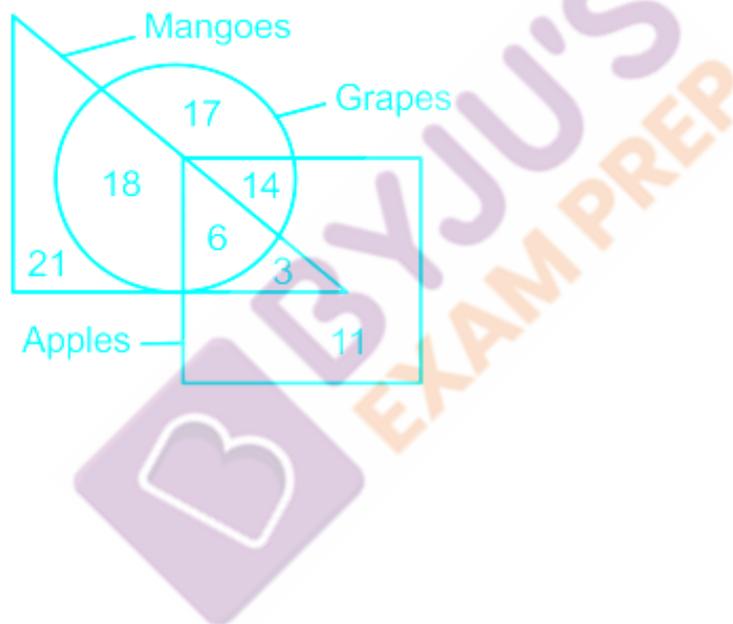
Statement: The Railway Minister expressed deep remorse and resigned from his post after the Kolkata-bound express train collided with an oncoming goods train causing death of more than 250 passengers.

Assumption I: The Railway Minister showed his conscientious side by taking responsibility for the accident under his leadership.

Assumption II: The minister was not happy with the portfolio he is eyeing the home ministry in the next cabinet reshuffle.

1. Only assumption I is implicit.
2. Only assumption II is implicit.
3. Both the assumptions are implicit
4. Neither assumption is implicit.

Que. 128 Given below is a diagram representing the favourite fruits of the students in a school. What is the number of children who like exactly 2 fruits - no more and no less?



1. 41
2. 32
3. 29
4. 35

Que. 129 Which one of the pairs of words given in the options shares the same relation as the pair given below does?

Goa : Pnaji

1. Assam : Digboi
2. Kohima : Itanagar
3. Manipur : Gangtok
4. Meghalaya : Shillong

Que. 130 The sum of the ages of a boy and his mother is 48 years. Four years ago, the mother's age was four times the son's then age. What is the difference between the ages of the son and the mother?

1. 21 years
2. 32 years

3. 27 years
4. 24 years

Que. 131 The table below presents the data of seats won by leading political parties in 6 states. Study the given information and answer the questions that follow.

Seats won by different political parties in different states						
Political Parties	Stats					
	State A	State B	State C	State D	State E	State F
Cock	12	21	3	2	4	19
Eagle	4	3	23	2	1	13
Bat	1	21	6	1	18	5
Owl	2	1	11	.0	9	14
Parrot	15	7	3	0	6	0
Swan	18	2	6	4	2	0

What is the difference between the number of seats won by the Bat party and the Parrot party in state B?

1. 14
2. 15
3. 7
4. 12

Que. 132 Read the information given below and answer the questions that follows by choosing the most appropriate option.

Three friends, A, B and C travel to work by only one mode of transport each - bus, train or car. They each work for a different company - angle Productions, Cosmos Pvt. Ltd., Hattrick Houses.

A DOES NOT work for Angle Productions and travels by either train or bus.

Either B or C works for Hattrick Houses.

The person who works for Angle Productions travels by car.

B travels by train.

Which of the following combinations is correct?

1. B - Angle Productions - car
2. B - Cosmos Pvt. Ltd. - train
3. A - Cosmos Pvt. Ltd. - bus
4. C - Hattrick Houses - bus

Que. 133 Karan, pointing to a picture, says, "She is the only daughter-in-law of my brother's daughter's maternal grandfather's son-in-law."

How is Karan related to the woman in the picture?

1. Son

2. Husband
3. Brother
4. Father

Que. 134 Among 5 girls in a class, Anita is taller than Sunita; Binita is taller than Gunita; Gunita is taller than Anita; Sunita is taller than Minita. Who among the given girls is the shortest?

1. Sunita
2. Minita
3. Gunita
4. Anita

Que. 135 The table below presents the data of seats won by leading political parties in 6 states. Study the given information and answer the questions that follow.

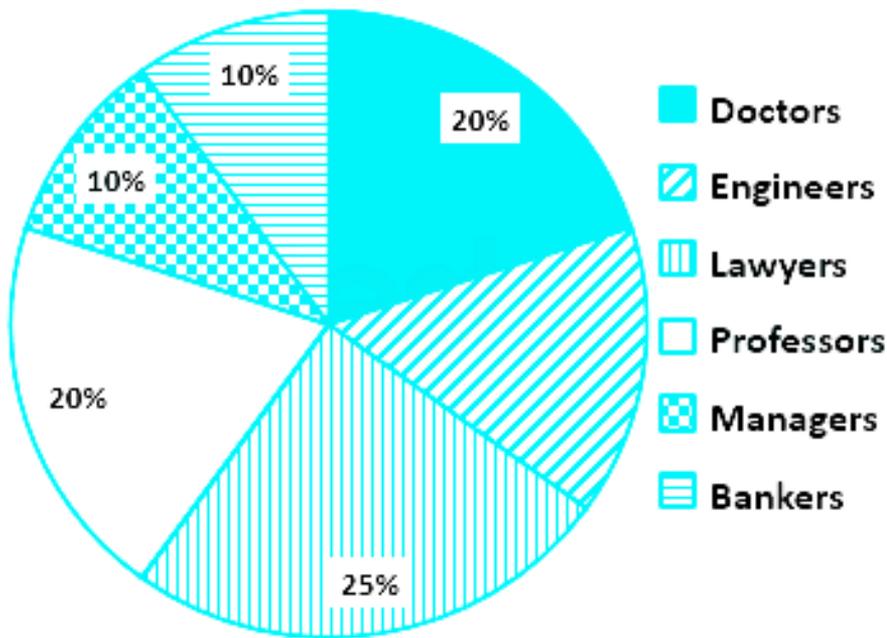
Seats won by different political parties in different states						
Political Parties	Stats					
	State A	State B	State C	State D	State E	State F
Cock	12	21	3	2	4	19
Eagle	4	3	23	2	1	13
Bat	1	21	6	1	18	5
Owl	2	1	11	0	9	14
Parrot	15	7	3	0	6	0
Swan	18	2	6	4	2	0

In which state were elections held for the maximum number of seats compared to the other states?

1. State B
2. State C
3. State D
4. State A

Que. 136 The pie-chart below shows the professions of 300 members of a hobby club. Study the given information and answer the questions that follow.

Professions of members of a hobby club



What percent of the total members are the engineers?

1. 20
2. 30
3. 15
4. 10

Que. 137 Which one of the pairs of words given in the options shares the same relation as the pair given below does?

Theocracy : God

1. Plutocracy : Wealthy
2. Technocracy : Robots
3. Stratocracy : State
4. Gerontocracy : Children

Que. 138 Select the option that will fill in the blank and complete the series correctly.

AD, EH, IL, MP, _____, UX

1. OS
2. QS
3. OT
4. QT

Que. 139 Given below are two statements labelled A and B, followed by two conclusions numbered I and II. Assuming that the information given in the statements and conclusions are true even if it appears to be at variance with commonly known facts, select the conclusion (s) that logically and definitely follow(s) from the two given statements,

Statement A: All singers are actors

Statement B: Some actors are dancers.

Conclusion I: Some dancers singers.

conclusion II: Some actors are dancers.

1. Neither conclusion follows
2. Only conclusion II follows.
3. Only Conclusion I follows
4. Both the conclusions follow

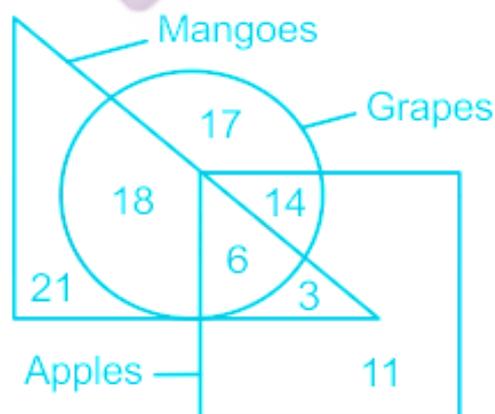
Que. 140 Parth went from his office to his project site. He started his journey facing north. First, he went 2 km straight. Then he turned to his right and went 3 km. Finally, he turned left and walked 2 km to reach the project site. What is the shortest distance between Parth's office and the project site (as the crow flies)?

1. 4.5 km
2. 5 km
3. 6.5 km
4. 15 km

Que. 141 The total weight of 30 students of a class is 360 kg. When the weight of their class teacher is added, the average weight of the group is seen to be 14 kg. What is the class teacher's weight in kg?

1. 61 kg
2. 74 kg
3. 60 kg
4. 59 kg

Que. 142 Given below is a diagram representing the favourite fruits of the students in a school. How many children like grapes with or without any other fruit?



1. 49
2. 35
3. 55
4. 41

Que. 143

While introducing Seema, Shakti says, "She is my mother's sister's only brother's daughter's paternal grandfather's only son-in-law's mothers."

How is Semma related to Shakti?

1. Sister
2. Wife
3. Mother
4. Paternal Grandmother

Que. 144 Fred bought 8 mobile phones for a certain amount of money. He bought 3 laptops with an equal amount of money. What is the ratio of the price of a mobile to that of a laptop?

1. 8 : 3
2. 11 : 3
3. 3 : 11
4. 3 : 8

Que. 145 Given below are two statements A and B, followed by two conclusions numbered I and II. Assuming that the information given in the statements conclusions are true even if it appears to be at variance with commonly known facts, select the conclusion (s) that logically and definitely follow (s) from the two given statements.

Statements A: All screws are nuts.

Statement B: Some nuts are bolts.

Conclusion I: Some bolts are nuts.

Conclusion II: All bolts are screws.

1. Neither conclusion follows.
2. Only conclusion II follows.
3. Only conclusion I follows.
4. Both the conclusions follows.

Que. 146 In a code language, 'dun dir hula' means 'fruit is sweet'; kai dir busa' means 'tea is hot'; kai dir chet menas 'tea is cold'. Which one of the following statements in that code language would mean 'tea is sweet'?

1. Kai dir dun
2. Dun dir busa
3. Kai dir hula
4. Dun dir chet

Que. 147 The table below presents the data of seats won by leading political parties in 6 states. Study the given information and answer the questions that follow.

Seats won by different political parties in different states

Political Parties	Stats					
	State A	State B	State C	State D	State E	State F
Cock	12	21	3	2	4	19
Eagle	4	3	23	2	1	13
Bat	1	21	6	1	18	5
Owl	2	1	11	.0	9	14
Parrot	15	7	3	0	6	0
Swan	18	2	6	4	2	0

Which political party won the maximum number of seats across all the states?

1. Owl party
2. bat party
3. Cock party
4. Swan party

Que. 148 Consider the given statement and decide which of the given assumptions is/are implicit in the statement.

Statement: The government has instructed all LPG agencies and dealers to transfer the subsidy to the beneficiary's account within 72 hours of delivery of LPG cylinder; and that failure to comply with the directive will attract heavy penalties.

Assumption I: The government does not enjoy public support as it is seen protecting business interests than helping the public.

Assumption II: The government is committed to passing all benefits to the actual beneficiaries.

1. Both the assumptions are implicit
2. Only assumption II is implicit.
3. Only assumption I is implicit.
4. Neither assumption is implicit.

Que. 149 Select the term that is related to term 3 in the same way as term 2 is related to term 1.

Apiology : Bees :: Entomology : ?

1. Trees
2. Birds
3. Insects
4. Cattle

Que. 150 Select the option that is related to the third term in the same way as the second term is related to the first term.

CAT : KITTEN :: SWAN : _____

1. PULLET

2. FRY
3. CYGNET
4. MAGGOT

Que. 151 The table below presents the data of seats won by leading political parties in 6 states. Study the given information and answer the questions that follow.

Seats won by different political parties in different states						
Political Parties	Stats					
	State A	State B	State C	State D	State E	State F
Cock	12	21	3	2	4	19
Eagle	4	3	23	2	1	13
Bat	1	21	6	1	18	5
Owl	2	1	11	0	9	14
Parrot	15	7	3	0	6	0
Swan	18	2	6	4	2	0

What was the total number of seats for which the elections were contested during this year?

1. 250
2. 259
3. 351
4. 261

Que. 152 A merchant bought 50 pencils for Rs. 200. He also bought 20 pens. Each pen costs three times each pencil. He sold all pens and pencils for Rs. 550. What is the profit percent earned in the transaction?

1. 10%
2. 30%
3. 50%
4. 25%

Que. 153 In a code language, PRIDE is written as OSHED and SWEAT is written as RXDBS. How will FLUID be written in that code language?

1. GKVHE
2. EMTJC
3. EMVHE
4. GKTJC

Que. 154 Select the odd one from the options.

1. Kilometer
2. Compass
3. Crescograph
4. Barometer

Que. 155 Khemchand bought a plot of land for Rs. 30 lakh. He spent Rs. 1 lakh on leveling the land, Rs. 85 lakh to construct 4 flats on the plot, and Rs. 1.25 lakh per flat for painting furnishing and advertising. Finally, he sold all the flats for Rs. 60 lakh each. Additionally, he added the GST of Rs. 50,000 for each flat. What was the profit in percentage that Khemchand made (after GST) in the entire transaction?

1. 125% profit
2. 100% profit
3. 50% profit
4. 25% profit

Que. 156 Read the information given below and answer the questions that follow by choosing the most appropriate option.

In a group of 40 friends, each person knows how to play at least one of the two games, sequence and ludo. 25 people know how to play sequence and 28 people know how to play ludo.

How many people can play both sequence and ludo?

1. 7
2. 25
3. 26
4. 13

Que. 157 Which one of the number pairs given in the options is similar to the one given below?
4 : 256

1. 5 : 625
2. 2 : 64
3. 7 : 16807
4. 3 : 343

Que. 158 Read the information given below and answer the question that follows by choosing the most appropriate option.

Four siblings - P, Q, R, S - like only one fruit each from amongst apple, orange, banana and cherry.

Each of them is studying only one subject each from history, economics, geography and literature.

P studies neither economics nor geography.

The person studying history likes oranges.

Neither Q nor R like cherry.

S is studying literature and doesn't like apples and bananas.

R likes bananas and does not like Geography.

1. R - literature - bannana
2. Q - geography - apple
3. R - history - orange
4. S - literature - apple

Que. 159 Which one of the these words will appear fourth when arranged in alphabetical order as in the English dictionary?

1. Quadruplet
 2. Quadrupe
 3. Quagmire
 4. Quadrant
 5. Quadripartite
1. Quadrant
 2. Quadripartite
 3. Quadruplet
 4. Quagmire

Que. 160 Select the option that will fill in the blank and complete the series correctly.
Z, X, U, Q, L, _____

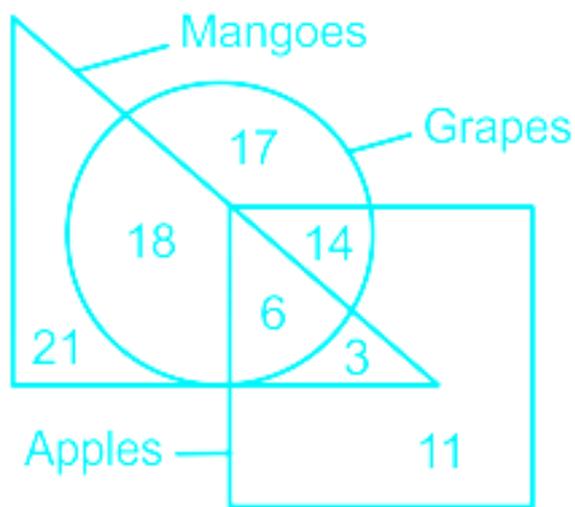
1. F
2. I
3. G
4. E

Que. 161 Parth went from his office to his project site. He started his journey facing north. First, he went 2 km straight. then he turned to his right and went 3 km. Finally, he turned left and walked 2 km to reach the project site.

In which direction is Parth's office located with respect to his right and went 3 km. Finally, he turned left and walked 2 km to reach the project site. In which direction is Parth's office located with respect to his project site?

1. North - west
2. North - east
3. South - west
4. South - east

Que. 162 Given below is a diagram representing the favourite fruits of the students in a school. How many children like only one (any one) fruit and no more?



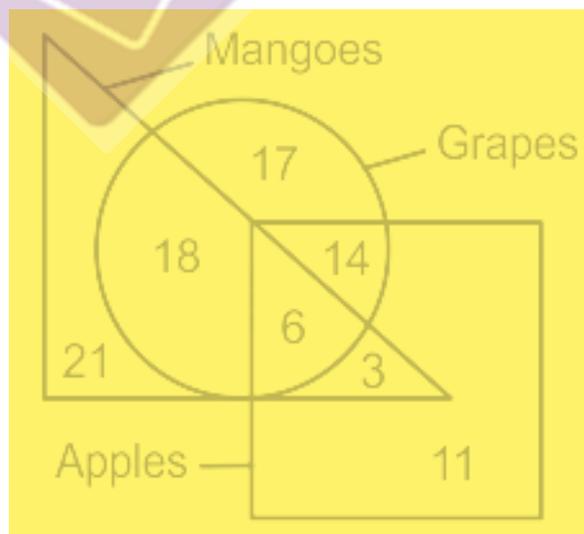
1. 14
2. 52
3. 49
4. 46

Que. 163 Select the term that is related to term 3 in the same way as term 2 is related to term 1.

Singer : Lyricist :: Actor : ?

1. Stuntman
2. Scriptwriter
3. Actress
4. Director

Que. 164 Given below is a diagram representing the favourite fruits of the students in a school. How many children like either apples or mangoes or both but NO other fruit?



1. 38
2. 32
3. 35
4. 29

Que. 165 Gopi runs faster than Junaid. Milind runs faster than Uma. Which of the following statements is required (and sufficient) to conclude who among these friends runs the fastest?

1. Junaid runs faster than Milind.
2. Gopi runs faster than Uma.
3. Ima runs faster than Junaid
4. Milind runs faster than Junaid.

Que. 166 Which one of the pairs of words given in the options shares the same relation as the pair given below does?

Bening : Malign

1. Grow : Develop
2. Harmful : Detrimental
3. Guilty : Innocent
4. Mischievous : Naughty

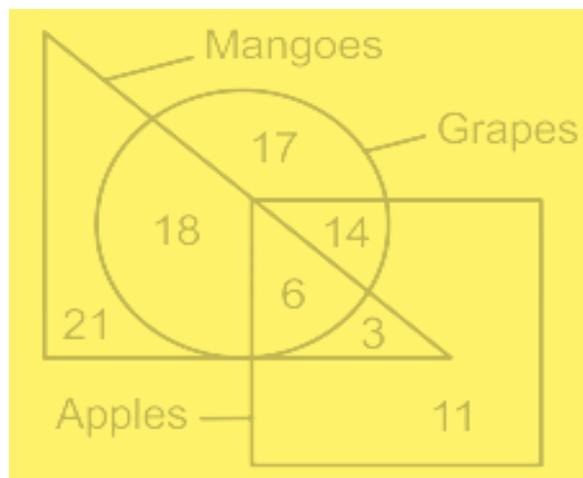
Que. 167 Read the information given below and answer the questions that follow by choosing the most appropriate option.

Manish is standing outside his office facing north. He walks 15 m to his right. Then, he turns to his left and walks for 23 m. Then, he turns to his right and walks for 6 m. Then, he turns to his right and walks for 43 m to reach his home

What is the distance he will have to walk if he followed a straight-lined path from his office to his home?

1. 20 m
2. 35 m
3. 29 m
4. 21 m

Que. 168 Given below is a diagram representing the favourite fruits of the students in a school. What is the total number of students that have been surveyed?



1. 96
2. 84
3. 87
4. 90

Que. 169 Read the information given below and answer the questions that follow by choosing the most appropriate option.

In a group of 40 friends, each person knows how to play at least one of the two games, sequence and ludo. 25 people know how to play sequence and 28 people know how to play ludo.

In this group, how many people know how to play exactly one of the two games?

1. 14
2. 27
3. 53
4. 37

Que. 170 You are given a question and two statements. Identify which of the statements is/are sufficient to answer the question.

Question: In a city, some people travel to work by bus, some people travel to work by train, some people travel to work by both bus and train, and some travel to work neither by bus, nor by train. The number of people who travel to work by both bus and train is how much less than the number of people who travel to work by neither?

Statements:

- (1) In the city, there are 384 people who travel to work by bus.
- (2) In the city, there are 672 people who travel to work by train,
 1. Both statements together are sufficient to answer the question, but neither statement alone is sufficient.
 2. Statements (1) and (2) together are not sufficient to answer the question.
 3. Statement (2) alone is sufficient to answer the question, but statement (1) alone is not sufficient
 4. Statement (1) alone is sufficient to answer the question, but statement (2) alone is not sufficient.

Que. 171 Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) guarantees such bank loans to micro and small enterprises which are having:

1. both collateral security and third party guarantee
2. neither collateral security nor third party guarantee
3. third party guarantee but no collateral security
4. collateral security but no third party guarantee

Que. 172 Which company has become the first Indian retail company to cross the annual revenue of Rupees one lakh crore?

1. Titan Company Ltd.
2. Shoppers Stop Ltd.
3. Aditya Birla Retail Ltd.
4. Reliance Retail Ltd.

Que. 173 India has extended the ban on import of milk and its products from _____ till laboratories at ports for testing presence of toxic chemical melamine are upgraded.

1. Germany
2. New Zealand
3. China
4. Australia

Que. 174 Which of the following is the state bird of Rajasthan?

1. Great Indian bustard
2. Black necked crane
3. Great hornbill
4. Green imperial pigeon

Que. 175 Distance covered by an object per unit time is called:

1. Pressure
2. Speed
3. Motion
4. Acceleration

Que. 176 Which of the following states has the lowest density of population according to census 2011?

1. Arunachal Pradesh
2. Nagaland
3. Mizoram
4. Manipur

Que. 177 Who among the following took away the famous Koh-i-Noor diamond and the jewel-studded Peacock Throne of Shahjahan from India?

1. Nadir Shah
2. Ahamad Shah Abdali
3. Zaman Shah
4. Timur Shah

Que. 178 Who has become the first Indian woman to be elected as a Fellow of the Royal Society of London?

1. Tessy Thomas
 2. Yamuna Krishnan
 3. Gagandeep Kang
 4. Sulabha K Kulkarni
-

Que. 179 Which of the following courts can inquire into proceedings of the Parliament under Article 122 of the Constitution of India?

1. The Supreme Court
2. Any District Court
3. No court
4. Any High Court

Que. 180 Who has been appointed as the First woman vice-chancellor of Jamia Millia Islamia University, New Delhi?

1. Sheeba Hamid
2. Rahela Farooqi
3. Asiya Chaudhary
4. Najma Akhtar

Que. 181 Consider the following statements:

1. The Speaker of the Lok Sabha appoints a Commission under Article 340(I) of the constitution of India to investigate the conditions of backward classes.
2. Article 338A of the Constitution of India deals with National Commission for Scheduled Tribes.
3. Article 338 of the Constitution of India deals with National Commission for Scheduled Castes.

Which of the above statements are correct?

1. 2 and 3 only
2. 1 and 3 only
3. 1 and 2 only
4. 1, 2 and 3

Que. 182 With which of the following sports is Gaurav Solanki associated?

1. Wrestling
2. Shooting
3. Basketball
4. Boxing

Que. 183 Who among the following economists is the author of the book 'I do What I Do'?

1. Manmohan Singh
2. Bimal Jalan
3. Raghuram Rajan
4. Pranab Mukherjee

Que. 184 With which country is India has jointly conducted the naval exercise, Varuna, in May 2019?

1. United Kingdom
 2. Germany
 3. France
 4. Norway
-

Que. 185 A lion is an example of:

1. ambitroph
 2. autotroph
 3. heterotroph
 4. pseudotroph
-

Que. 186 Who has been awarded the Rabindranath Tagore Literary Prize, 2019?

1. Rana Dasgupta
 2. Subodh Sarkar
 3. Joy Goswami
 4. Subhro Bandopadhyay
-

Que. 187 Which one of the following slows down the fast (high-energy) neutrons emitted during fission to energies at which they are more likely to induce fission in a nuclear reaction and thereby helps initiate and sustain a fission chain reaction?

1. Reactor
 2. Moderator
 3. Igniter
 4. Reflector
-

Que. 188 Which of the following freedom fighters was a co-founder of the Swaraj Party along with Motilal Nehru?

1. Ambica Charan Mazumdar
 2. Chittaranjan Das
 3. Rashbihari Ghosh
 4. Bhupendra Nath Bose
-

Que. 189 Researchers of which institute have identified a new method to detect breast and ovarian cancer by identifying certain proteins present in saliva?

1. IIT Roorkee
2. IIT Bhubaneswar

3. IIT Hyderabad
4. IIT Kharagpur

Que. 190 Which is the smallest union territory of India in terms of total area?

1. Puducherry
2. Daman and Diu
3. Chandigarh
4. Lakshadweep

Que. 191 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. It rained heavily last winter and the little stream near our house became a big river.
 - B. Luckily, the water did not reach any of the houses in our village.
 - C. But the river carried away our beautiful wooden bridge.
 - D. It burst its bank and the fields all around were soon full of water.
1. ABCD
 2. ACDB
 3. ADBC
 4. ACBD

Que. 192 Direction: Fill in the blank with the most appropriate option.

Hardly had he come out of the factory _____ an explosion shook the entire area.

1. when
2. then
3. than
4. till

Que. 193 Select the option in which the usage of the given word is INCORRECT or INAPPROPRIATE.
MASTER.

1. She could not master the courage to tell her friend about her loss.
2. The terrorist was a master of disguise.
3. He is the master of his house.
4. She quickly mastered the art of interviewing people

Que. 194 Direction: In the following question, out of the four alternatives, select the word similar in meaning to the given word.

RESISTANCE

1. Compliance
2. Ignorance
3. Assistance
4. Defiance

Que. 195 Fill in the blank with the most appropriate option.

The chairman apprised the members _____ the company's current financial status.

1. to
2. of
3. with
4. off

Que. 196 Fill in the blank with the most appropriate option.

Do you know that during the reign of Mohammad bin Tughlaq, the capital _____ from Delhi to Daulatabad?

1. was shifted
2. is being shifted
3. was shifting
4. has been shifting

Que. 197 Select the most appropriate SYNONYM of the given word.

COMMENCE

1. Initiate
2. Conclude
3. Terminate
4. Inflate

Que. 198 Select the most appropriate synonym of the given word.

INCONGRUOUS

1. compatible
2. contradictory
3. consistent
4. conspicuous

Que. 199 Direction: Select the INCORRECTLY spelt word.

1. fullfil
2. forfeit

3. frontier
4. frivolous

Que. 200 Select the option that best gives the meaning of the underlined word.

The pilot of the plane will surely be acquitted when all the facts are known.

1. Absolved
2. Denounced
3. Incriminated
4. Expelled

Que. 201 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. A runner at this year's London Marathon fell down.
- B. Another runner helped him up, but he fell down again.
- C. He was exhausted.
- D. It was nice of the man to help his competitor.
- E. The finish line was only 200 metres away, so the man helped him to it.

1. BEDAC
2. ACEBD
3. BDEAC
4. ACBED

Que. 202 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A:** If ill people do not get help, it can kill them.
B: Cholera is a contagious disease which causes diarrhoea.
C: Last Wednesday, five people had cholera in Mozambique.
D: By Friday, 139 people had it.

1. BCAD
2. ABCD
3. CDAB
4. BACD

Que. 203 Select the option in which the usage of the given word is INCORRECT or INAPPROPRIATE.

EXPECT

1. She is only a child. You expect too much from her.
2. I am ready to take you anywhere expect the lake.
3. They expect us to work on Saturdays as well.

4. We expected him yesterday, but he didn't turn up

Que. 204 Fill in the blank with the most appropriate option.

After a long discussion, I prevailed _____ him to accept the proposal.

1. upon
2. against
3. to
4. above

Que. 205 Select the option in which the usage of the given word is INCORRECT or INAPPROPRIATE.
RIGHT

1. He tried to right hatred in them by telling them falsehoods about minority groups.
2. You were quite right to refuse this assignment.
3. The driver quickly righted the car after it skidded.
4. I will come right away, without any delay.

Que. 206 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. Some birds make the long journeys in easy stages, stopping to rest on the way.
 - B. Others fly great distances, without pausing to rest and feed.
 - C. Some fly by day, some both, by day and night.
 - D. But most of them speed on their way through the darkness after the sun has set.
1. ABCD
 2. ACBD
 3. DCBA
 4. DABC

Que. 207 Select the most appropriate synonym of the given word.
EXTRANEIOUS

1. irrelevant
2. irresolute
3. material
4. pertinent

Que. 208 Select the INCORRECTLY spelt word.

1. superstitious
2. surgeon

3. superannuate
4. supercede

Que. 209 Select the option that best gives the meaning of the underlined word.

The hospital management was very callous towards the patients.

1. Conscious
2. Responsible
3. Insensitive
4. Ignorant

Que. 210 In this question, A and F are the first and the last sentences of a passage. The rest of the sentences namely B, C, D and E are jumbled. Choose the correct order of these sentences from the given options.

- A. Late Microsoft co-founder Paul Allen founded the company Stratolaunch.
- B. It weighs 227 metric tonnes, has six engines, is 61-metres-long and has a wingspan longer than a football field.
- C. It is designed to carry a rocket loaded with a satellite 7,620 metres into the air before shooting the rocket into space.
- D. It successfully tested the largest plane by wingspan on Saturday, 14 April 2019.
- E. Stratolaunch says that launching a satellite like this is more cost-effective, as planes require less fuel than traditional rockets, cheaper infrastructure and equipment.
- F. They are also better equipped to fend off weather delays.
1. BECD
 2. DBCE
 3. CBED
 4. DCBE

Que. 211 Select the correctly spelt word.

1. archaeology
2. archeaology
3. archeology
4. archaelogy

Que. 212 In this question, A and F are the first and the last sentences of a passage. The rest of the sentences namely B, C, D and E are jumbled. Choose the correct order of these sentences from the given options.

- A. Nearly 90 per cent of Egyptian voters approved of granting President Abdel Fattah el-Sisi who is in his second term currently (assumed office in 2018), more parliamentary power.
- B. However, an article specific to el-Sisi extends his current four-year term to six, and it allows him to run again in 2024, meaning that he could stay in office until 2030.

- C. The new amendments extend the Egyptian president's terms from four to six years, and they allow for a maximum of two terms.
- D. All of this comes as a surprise because, in 2017, Sisi said that he would respect Egypt's constitution and he would not seek a third term.
- E. Sisi thanked the Egyptian people in a tweet on Tuesday, saying that the vote would be written down in Egyptian historical records.
- F. Last year, most voters re-elected him which was not too surprising as several rivals were either in jail or forced to quit.
1. CDEB
 2. DBCE
 3. BECD
 4. CBED

Que. 213 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. I looked for a while and went home a little impressed.
- B. Only one end of its roughly cylindrical shape was visible.
- C. I went over with other curious sightseers to look at it.
- D. One evening a meteor fell near our suburban house.
- E. In size it had a diameter of about thirty yards.
1. DBCAE
 2. CBEAD
 3. DCBEA
 4. ABECD

Que. 214 Select the most appropriate ANTONYM of the given word.
DEVIOUS

1. shrewd
2. forthright
3. designing
4. scheming

Que. 215 Direction: In the following question, select the choice whose meaning is opposite to the word shown in capitals for the below question.

- TEMERITY
1. Boldness
 2. Timidity
 3. Audacity
 4. Rashness

Que. 216 Select the option in which the usage of the given word is **INCORRECT** or **INAPPROPRIATE**.

LOSE

1. This dress is too lose for you
2. He lost his two sons in the Vietnam War
3. You are losing your hair fast
4. Don't lose your way in the forest.

Que. 217 Select the option in which the usage of the given word is **INCORRECT** or **INAPPROPRIATE**.

ABSORB

1. I have never absorbed him doing otherwise.
2. He is entirely absorbed in his business
3. It is difficult for my country to absorb all the immigrants.
4. Before the age of five, children can absorb three languages if they are taught well.

Que. 218 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. I tried to look for my mother.
 - B. All I could hear was frogs croaking—and the rain.
 - C. I found myself lying under a section of three seats turned upside down.
 - D. But there was no sign of her or any other passengers or the plane.
 - E. It was still light when the rain woke me up.
1. ECADB
 2. EACBD
 3. DBEAC
 4. CDBEA

Que. 219 Fill in the blank with the most appropriate option.

_____ the train was five hours late, it covered the lost time in three hours.

1. Because
2. Although
3. However
4. In spite of

Que. 220 Fill in the blank with the most appropriate option.

Oh, what a pretty dress! But you _____ such an expensive gift.

1. needn't buy
2. didn't need buying

3. hadn't needed to buy
4. needn't have bought

Que. 221 Select the option which is NOT an antonym of another word by way of adding the prefix 'dis-'

1. disorder
2. discard
3. disappear
4. disintegrate

Que. 222 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. Three walls have posters with prayers printed in large letters.
 - B. It is very sparsely furnished.
 - C. The fourth has a chart with a family tree of the organisation.
 - D. I await Mother Teresa in her office.
1. DCBA
 2. BDCA
 3. DBAC
 4. BADC

Que. 223 Select the correctly spelt word.

1. scintilating
2. scinttilating
3. scintillating
4. schintillating

Que. 224 Fill in the blank with the most appropriate option.

People descended from the bus _____ the bus stopped.

1. while
2. no sooner
3. as soon as
4. till

Que. 225 Select the option which is NOT an antonym of another word by way of adding the prefix 'in-'?

1. inimitable
2. inorganic
3. inkling

4. inhospitable

Que. 226 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. My husband would not be back until late and I decided to settle down in a comfortable chair and read a book.
B. I put the children to bed early and prepared some coffee.
C. It had been a tiring day and I was looking forward to a quiet evening.
D. Soon, I was sitting comfortably with a cup of coffee and a book.

1. CBDA
2. CADB
3. CDAB
4. CABD

Que. 227 Direction: Fill in the blank with the most appropriate option.

Vinod walks so fast that I can hardly keep _____ him.

1. up with
2. next to
3. aside of
4. along with

Que. 228 Select the correctly spelt word.

1. flamebuoyant
2. flemboyant
3. flamboyant
4. flambouyant

Que. 229 Fill in the blank with the most appropriate option.

She burst _____ tears at the sight of her son after a long separation.

1. out
2. with
3. into
4. in

Que. 230 Fill in the blank with the most appropriate option.

Nowadays prices for a kid's bike can run _____ Rs. 5,000.

1. as high to
2. so high to

3. as high as
4. so high as

Que. 231 Directions: Read the following passage and answer the questions that follow.

Delhi reportedly produces 10,000 metric tonnes of garbage every day and the space to dump this garbage is a major problem. East Delhi's Ghazipur garbage dump stands at 65 metres tall, very close to the height of Qutub Minar, which stands at 73 metres. As Mumbai reeled under a heatwave, fire broke out in the city's largest landfill site at Deonar on 26 March 2018. Dhapa dumping ground in Kolkata has been burning since November 2018 and the thick smoke billowing out of the site is making the city's polluted air even more toxic. Since 20 October fires caused by toxic gases have been raging inside a landfill in Bhalswa, an urban village in North Delhi where a 40-acre graveyard of waste waits for its own death. Toxic smoke from a blaze at the Okhla landfill in the national capital caused health problems amongst local residents.

State governments and municipal corporations have started to take cognizance of the problems of waste management. Maharashtra government imposed a complete ban on plastic carry bags and thermocol cutlery, becoming the 18th state of the country to impose such a ban. Two hundred residents' associations/buildings in south Mumbai decided to become plastic-free as a drive against single-use plastics was launched here. The Golden Temple will replace the use of plastic carry bags with compostable ones to make its contribution to environment protection. The Telangana government issued guidelines to ban plastic usage in urban local bodies in the state.

With Mount Pirana growing at an alarming rate, the Ahmedabad Municipal Corporation (AMC) has finally put its foot down. The corporation will not collect domestic waste if it is not segregated into dry and wet. With an aim to resolve waste management problems of residents in Gurugram, the agency responsible for solid waste management in the city has taken the local management approach by appointing ward managers in each of the 35 wards. Soon, all the municipalities and corporations in Tamil Nadu will begin sending non-recyclable waste to the cement plants and thermal power stations to be incinerated and converted into fuel. The municipal corporation in Cuttack will enforce a new set of regulations, including fines for littering roads in front of homes.

The first paragraph of the passage mainly talks about the:

1. landfill area of big cities
2. waste generated by big cities
3. burning of the landfills in big cities
4. environment pollution in big cities

Que. 232 Where will the civic bodies use the cement plants and thermal power stations to incinerate the non-recyclable waste?

1. Ahmedabad
2. Tamil Nadu
3. Cuttack
4. Gurugram

Que. 233 Arrange the following in the correct order and select the sequence from the options.

- A. Toxic smoke
- B. Burning of landfill site

C. Health problems for people

D. Air pollution

1. ADBC
2. DACB
3. BADC
4. ABDC

Que. 234 What is the main idea of the second paragraph of the passage?

1. RWA's (Resident Welfare association) drive against single use of plastic
2. Golden Temple's efforts for environment protection
3. Various agencies trying to make their area plastic free
4. Various measures for waste reduction.

Que. 235 'The Ahmedabad Municipal Corporation (AMC) has finally put its foot down.'

What does the underlined phrase 'put its foot down' mean in the given context?

1. Accelerated the efforts
2. Adopted a firm policy
3. Kicked out the problem
4. Invested in something it supports

Que. 236 **Directions: Read the given passage and answer the questions that follow.**

Berlin was a modest provincial town in the second half of the 17th century, but it was the residence of Frederick William I, the "Great Elector" of Brandenburg-Prussia (1640-88), who ordered in 1679 that the residents of Berlin should hang a lantern light outside every third house at dusk each evening from September to May. The Berliners failed to comply and on 23 September 1680; the citizenry petitioned the elector to eliminate the lighting requirement, arguing that they could not afford it. The elector responded by establishing public street lighting based on the Amsterdam model. About 1,600 lanterns went up in Berlin, Coln and Werder — all at the citizens' expense.

As Vienna recovered from the siege of 1683, imperial authorities began to police the city more effectively. In 1685, an imperial patent reinforced the city law requiring anyone out after the curfew bell to carry a lantern. In 1687, the imperial administrator of Lower Austria, Count Johann Quintin Kirger, began the establishment of public street lighting in Vienna. Several obstacles to the plan quickly emerged: there were not enough tinsmiths in Vienna to manufacture the lanterns, the start-up and maintenance costs were higher than expected, and the city council resisted the lighting measure because of its expense. With the support of Emperor Leopold I. Kirger was able to set up the lighting by the following spring: the streets were lit for the first time on Pentecost eve (5 June) 1688. The lighting was financed by a tax on imported wine, arranged through an intricate compromise with the city council. In 1698, the city council, which was already supplying twenty-six night-lanterns for the inner courtyard of the imperial palace (the Hofburg) itself was asked "by the spoken request of the imperial court" to also illuminate the imperial palace of Ebersdorf, just outside the city walls. with fourteen lanterns. The court made ready use of the municipal lighting system to illuminate its own representative buildings.

How did Berlin get the street lighting system in the 17th century?

1. Streetlights were installed in the city and the public paid for it.

2. The Great Elector ordered the people to keep the streets lit.
3. The people hung lanterns in front of their houses.
4. Berliners petitioned to the Great Elector to put up the street lights

Que. 237 In 1685, which event took place in Vienna?

1. Public street lighting was established in Vienna.
2. The city law required that anyone out after the curfew bell carry a lantern.
3. Imperial authorities began to police the city more effectively after the siege.
4. The city council resisted the lighting of the city because of its expense.

Que. 238 Which of the following cities got street lighting first?

1. Vienna
2. Amsterdam
3. Berlin
4. Werder

Que. 239 Which statement is NOT true according to the passage?

1. The city council of Vienna collaborated in lighting the streets of Vienna from the beginning.
2. The citizens of Berlin had to pay for the street lights.
3. The citizens of Berlin could not carry out the orders because they were poor.
4. The installation of lighting in Vienna started in 1687.

Que. 240 Who among the following was the most enthusiastic to establish street lighting system in Vienna?

1. Leopold I
2. The imperial palace of Ebersdorf
3. The city council
4. Johann Quintin Jorger