

Section : Domain Questions
Q. 1 As per IS 2386 (Part IV)-1963, for the determination of aggregate impact value, the free fall height of metal hammer of weight 13.5 to 14 kg is

Ans
X 1. $250(+/-) 5 \mathrm{~mm}$
X 2. $150(+/-) 5 \mathrm{~mm}$
3. $380(+/-) 5 \mathrm{~mm}$

X4. $330(+/-) 5 \mathrm{~mm}$
Q. 2 Identify the INCORRECT statement with respect to the advantages of the aeration technique used in water treatment.

Ans

1. It reduces the pH value of water.
$\times 2$.
It converts iron and manganese from their soluble state to insoluble state.
$\times 3$.
It removes the taste and odour caused by gases due to organic decomposition.
$X$ 4. It decreases the carbon dioxide content of water.
Q. 3 Identify the correct statement with respect to static indeterminacy for the given truss with hinged support at A and roller support at B. Consider that the diagonal members are NOT connected to each other.


Ans
$X$ 1. Statically determinate
$X$ 2. Statically indeterminate to degree one
$x$ 3. Statically indeterminate to degree three
$\checkmark$ 4. Statically indeterminate to degree two
Q. 4 Consider the below statements with respect to the triangular weir and identify the correct answer.

Statement A: The triangular weir gives less accurate results than a rectangular weir for measuring low discharges
Statement B: In the case of a triangular weir with known values of the angle of weir and co-efficient of discharge, the height of water over the weir is the only data required for the computation of discharge.

Ans
$X$ 1. Both statements are incorrect.
$\checkmark$ 2. Statement B is correct and A is incorrect.
$X$ 3. Both statements are correct.
$X$ 4. Statement A is correct and B is incorrect.
Q. 5 For open channel flow with hydraulic radius as characteristic length, the flow is classified as turbulent, if Reynold's number of the flow is $\qquad$
Ans

1. less than 2000
2. more than 2000

X 3. more than 1000
$\times 4$. less than 500
Q. 6 Which of the following structures is classified as a statically indeterminate structure?

Ans
$X$ 1. Three hinged arch
$\times 2$.
Overhanging beam with one hinged support and another roller support
3. Propped cantilever beam
$X$ 4. Cantilever beam
Q. 7 Consider the below statements with respect to cutback bitumen and identify the correct answer.

Statement A: The addition of petroleum hydrocarbon (Kerosene) decreases the viscosity of the bitumen.
Statement B: The addition of petroleum hydrocarbon (Kerosene) increase the penetration of bitumen on the asphalt surface.
Ans 1. Both statements are correct.
$X$ 2. Statement $A$ is correct and $B$ is incorrect.
$X$ 3. Statement B is correct and A is incorrect.
$X$ 4. Both statements are incorrect.
Q. 8 The natural water content, liquid limit, and plastic limit of a clay sample are $22 \%, 44 \%$, and $19 \%$, respectively. Calculate its consistency index.
Ans
$\times 1.0 .65$
$\checkmark$ 2. 0.88
$\times$ 3. 0.76
$\times 4.0 .97$
Q. 9 Cross sections, which can develop the plastic moment of resistance, but have inadequate plastic hinge rotation capacity for the formation of a plastic mechanism before buckling are classed as:

Ans
$X$ 1. slender sections
$X$ 2. plastic sections
$\checkmark$ 3. compact sections
$X$ 4. semi compact sections
Q. 10 Identify the INCORRECT statement with respect to the influence of compaction on the properties of soil.

Ans $\times 1$
A well-compacted soil shows reduced compressibility when compared to poorly compacted soil.
$\times 2$.
A well-compacted soil shows increased shear strength when compared to poorly compacted soil.

- 3. 

A well-compacted soil shows increased permeability when compared to poorly compacted soil.
$\times 4$.
A well-compacted soil shows increased density when compared to poorly compacted soil.
Q. 11 __ are manufactured by using lignocellulose materials, which are agglomerated, formed and pressed together
by the use of an organic binder together in the presence of heat, pressure or moisture.
Ans $\quad \times 1$. Plywood
$\times 2$. Veneers
$\times$ 3. Block boards

- 4. Particle boards
Q. 12 In Tacheometric surveying, the Subtense bar method is also called the $\qquad$ .

Ans

1. movable hair method
$X$ 2. normal chord method
$X$ 3. tangential method
$X$ 4. fixed hair method
Q. 13 Pick the odd one out with respect to the type of failure of tension members.

Ans

- 1 Lateral torsional flexural buckling
$X$ 2. Net section rupture
$x$ 3. Gross section yielding
$X$ 4. Block shear failure
Q. 14 Identify the INCORRECT statement with respect to concrete making.

Ans $\times 1$. Machine mixing is more efficient than hand mixing
$\times 2$.
Weigh batching is more precise compared to volume batching in making concrete
$\times 3$.
The separation of ingredients of concrete is termed as segregation of concrete
$\checkmark 4$.
Bleeding of concrete reduces the possibility of laitance formation on concrete surface
Q. 15 In which of the following system is the sewage allowed to sprinkle over a bed of coarse, rough and hard filter media, and it is then collected through the under drainage system?
Ans $\quad X 1$. Contact beds
$X 2$. Intermittent sand filters
$X$ 3. Activated sludge process
$\checkmark$ 4. Trickling filters
Q. 16 Consider the below statements with respect to the turbidity of water and identify the correct answer.

Statement A: Turbidity of water is imparted by the dissolved matter present in water.
Statement B: Jackson's turbidimeter is a laboratory apparatus which is used to measure the turbidity of water.
Ans
$X 1$. Both statements are incorrect.
2. Statement B is correct and A is incorrect.
$X$ 3. Statement A is correct and B is incorrect.
$X$ 4. Both statements are correct.
Q. 17 Following the working stress method of design as per IS 456:2000, calculate the modular ratio of M30 grade concrete
subjected to compressive stress due to bending, considering the permissible compressive stress in M30 grade concrete
in bending as $10 \mathrm{~N} / \mathrm{mm}^{2}$.
Ans
$X$ 1. $14.00 \mathrm{~N} / \mathrm{mm}^{2}$
$\times 2.16 .00 \mathrm{~N} / \mathrm{mm}^{2}$
) 3. $9.33 \mathrm{~N} / \mathrm{mm}^{2}$
X $4.11 .25 \mathrm{~N} / \mathrm{mm}^{2}$
Q. 18 A fully saturated soil mass is an example of a $\qquad$ .

Ans $X$ 1. four-phase system
$X$ 2. one-phase system
$x$ 3. three-phase system
$\checkmark$ 4. two-phase system
Q. 19 The maximum water content at which reduction in water content will not cause a decrease in the volume of a soil mass is known as the $\qquad$
Ans
$X$ 1. liquidity index
$X$ 2. plastic limit
$x$ 3. toughness index
$\checkmark$ 4. shrinkage limit
Q. 20 The direction of a line AB measured in whole circle bearing system is found to be $105^{\circ} 30^{\prime}$, the direction of the same line in quadrantal bearing system is $\qquad$
Ans
X 1. N $285^{\circ} 30^{\prime} \mathrm{W}$
2. S $74^{\circ} 30^{\prime} \mathrm{E}$

X 3. S $105^{\circ} 30^{\prime} \mathrm{W}$
X4. N $15^{\circ} 30^{\prime} \mathrm{E}$
Q.21 A bar of length 2.5 m is subjected to an axial pull of 200 kN , if the change in length due to the applied load is 5 mm , calculate the linear strain experienced by the bar in the direction of the applied load.
Ans
$\times 1.0 .0250$
$\checkmark$ 2. 0.002
$\times$ 3. 0.25
X4. 0.00725
Q. 22 According to IS 800-2007, the maximum value of effective slenderness ratio for compression flange of a beam against lateral torsional buckling is $\qquad$
Ans $\times 1.200$
-2. 300
X3. 415
$\times 4.280$
Q. 23 As per IS soil classification, which of the following symbols is used for poorly graded or gravelly sands?

Ans

- 1. SP
$\times$ 2. MH
$\times$ 3. GP
$\times 4$ SC
Q. 24 Two columns $\mathrm{C}_{1}$ and $\mathrm{C}_{2}$ spaced 3 m centre to centre, are subjected to axial loads of 600 kN and 800 kN , respectively. If good soil for the foundation with safe bearing capacity as $200 \mathrm{kN} / \mathrm{m}^{2}$, is available at 2 m depth below the ground level, identify the type of foundation which is suitable and economical. Assume the width of footing is restricted to 2 m .

Ans
$X$ 1. Grillage foundation
$X$ 2. Pile foundation
$\checkmark$ 3. Isolated footing
X4. Mat foundation
Q. 25 According to IS 10262:2019, the approximate amount of entrapped air to be expected in normal (non-air-entrained)
concrete is $\qquad$ of volume of concrete, if the nominal maximum size of aggregate used in concrete is 10 mm .

Ans
X 1. $0.50 \%$
$\times 2.1 \%$
X 3. $2 \%$

- 4. $1.50 \%$
Q. 26 Identify the direct method of contouring in a survey work.

Ans $\quad \times 1$. Contouring by squares
$X$ 2. Contouring by tacheometric method
3. Contouring by vertical and horizontal control
$X 4$. Contouring by cross sections
Q. 27 Which of the following tests on workability allows the concrete to fall from a certain height, so that concrete is compacted partially?

Ans
$X$ 1. Slump test
$X$ 2. Flow test
$X$ 3. Vee Bee consistometer test

- 4. Compacting factor test
Q. 28 Identify the INCORRECT statement with respect to asbestos material.

Ans
$\times 1$
Asbestos molecules are strongly bound together only in one direction, whereas the lateral bond with adjacent molecules is quite weak
$\times 2$.
Asbestos is used to make sheets (A.C. sheets) and boards for roofing.
$\times 3$.
Non-acid-resistant asbestos is represented by chrysotile asbestos.

- 4. 

When asbestos is heated at $550^{\circ} \mathrm{C}$, asbestos loses elasticity and strength, becomes brittle and restores its properties on cooling.
Q. 29 Which of the following laboratory tests is NOT used to determine the shearing resistance of soil?

Ans

1. Recuperation test
$X$ 2. Vane shear test
$X$ 3. Unconfined compression test
$X 4$. Direct shear test
Q.30 As per IS 456: 2000, to ensure the lateral stability in a cantilever beam, the clear distance from the free end of the cantilever to the lateral restraint shall not exceed $\qquad$ ; where b is the breadth of the compression face midway between the lateral restraints

Ans

1. 60 b
$\times 2.75 \mathrm{~b}$

- 3. 25 b
$\times 4.40 \mathrm{~b}$
Q. 31 Consider the below statements with respect to the design of RCC beams and identify the correct answer.

Statement A: Spacing of shear reinforcement in a simply supported RCC rectangular beam shall be reduced at the middle portion along the length of the beam when compared to a portion of the beam near the supports.

Statement B: The position of longitudinal reinforcement shall be above the neutral axis in case of a cantilever beam subjected to uniformly distributed load directed towards down.

Ans
$X 1$. Both statements are incorrect.
$X 2$. Statement A is correct and B is incorrect.
$X$ 3. Both statements are correct.
4. Statement B is correct and A is incorrect.
Q. 32 Consider the below statements with respect to plate girders and identify the correct answer.

Statement A: The intermediate transverse stiffener increases the buckling resistance of the web caused by shear.
Statement B: When the computed shear stress in the web of a plate girder is less than the critical shear stress, intermediate stiffeners are theoretically not required.

Ans
$X 1$. Statement B is correct and A is incorrect.
$X$ 2. Both statements are incorrect.
$\checkmark$ 3. Both statements are correct.
$X$ 4. Statement A is correct and B is incorrect.
Q. 33 Which of the following expressions is correct to compute the moment of inertia ( $\mathrm{I}_{\mathrm{yy}}$ ) of a hollow section shown in the figure?


Ans
X 1. $\frac{\pi}{16}\left(D^{4}-d^{4}\right)$
X2. $\frac{\pi}{32}\left(\mathrm{D}^{4}-\mathrm{d}^{4}\right)$
X 3. $\frac{\pi}{8}\left(D^{4}-d^{4}\right)$
4. $\frac{\pi}{64}\left(D^{4}-d^{4}\right)$
Q. 34 Which of the following type of vibrators is suitable for compacting screed concrete layer laid on existing floors with a thickness of less than 20 cm ?

Ans
$X$ 1. Form vibrators
$X$ 2. Vibrating tables

- 3. Surface vibrators
$X$ 4. Internal vibrator
Q. 35 A soil sample has a porosity of $25 \%$, calculate its void ratio.

Ans
$\times 1.0 .67$

- 2. 0.33
$\times 3.0 .25$
$\times 4.0 .50$
Q. 36 Identify the INCORRECT statement with respect to the wastewater carriage system.

Ans
The load on the treatment plant is less in the combined system when compared to a separate system.
$\times 2$.
The sewage in the separate system will be of more uniform character, and so will lend itself more easily to putrification.
$\times 3$.
The large size of sewers is required in the combined system when compared to a separate system.
$\times 4$.
Chances of chocking are less in the combined system when compared to a separate system.
Q. 37 Calculate the target mean compressive strength at 28 days for M25 grade concrete, if the assumed standard deviation is $4 \mathrm{~N} / \mathrm{mm}^{2}$.
Ans
$X 1.25 .00 \mathrm{~N} / \mathrm{mm}^{2}$
X 2. $38.25 \mathrm{~N} / \mathrm{mm}^{2}$
X 3. $42.25 \mathrm{~N} / \mathrm{mm}^{2}$
4. $31.60 \mathrm{~N} / \mathrm{mm}^{2}$
Q. 38 As per IS 1130:1969, marble slabs shall be supplied with the thickness that ranges between $\qquad$ -

Ans $\times 1.5$ and 50 mm
$\times 2.15$ and 75 mm
$\times 3.50$ and 200 mm
4. 20 and 150 mm
Q. 39 At the time of grinding of cement clinker, a small quantity of Gypsum is added to the clinker $\qquad$ -.

Ans
$X$ 1. to reduce the amount of sulphates in cement
$X$ 2. to reduce the shrinkage of cement
$\checkmark$ 3. to prevent the flash setting of cement
$X$ 4. to increase the rate of hardening of cement
Q. 40 Identify the member 'A' used in the truss shown in the figure.


Ans $\quad \times 1$. Principal tie
2. Principal rafter
$X$ 3. Purlin
$X 4$. Side bracing
Q. 41 For open channel flow with hydraulic radius as characteristic length, the flow is classified as laminar, if Reynold's
number of the flow is
Ans
$X$ 1. less than 1000
$X$ 2. between 500 to 2000
$\checkmark$ 3. less than 500
$\times$ 4. more than 1000
Q. 42 Find the surface tension in a soap bubble of 80 mm diameter, having an internal pressure $3 \mathrm{~N} / \mathrm{m}^{2}$ in excess of the outside pressure.
Ans
-1. $0.03 \mathrm{~N} / \mathrm{m}$
$\times 2.0 .08 \mathrm{~N} / \mathrm{m}$
X 3. $0.01 \mathrm{~N} / \mathrm{m}$
X $4.0 .24 \mathrm{~N} / \mathrm{m}$
Q.43 A cantilever beam of span 3.5 m is subjected to 2 point load shown in the figure. Calculate the slope at point A. Take EI as constant throughout its length.


Ans
X 1. $-\frac{156.5}{E I}$
X2. $-\frac{120}{E I}$
3. $-\frac{83.75}{E I}$

X4. $-\frac{56.25}{E I}$
Q. 44 As per IS 10262: 2019, the required water content per cubic metre of concrete for the nominal maximum size of aggregate for the desired workability (other than 50 mm slump) may be increased or decreased by about $\qquad$ for each increase or decrease of 25 mm slump.

Ans

1. $3 \%$
$\times 2.5 \%$
X 3. $10 \%$
$\times 4.1 \%$
Q. 45 According to the Ministry of Environment, forest and climate change Government of India, which of the following classes of water can be used for the propagation of wildlife and fisheries?

Ans
$X$ 1. Class B
2. Class D

X 3. Class C
X 4. Class A
Q. 46 Consider the below statements with respect to principles of surveying and identify the correct answer.

Statement A: Locate the position of a point on the ground by measurement from two reference points.
Statement B: Work from part to whole to prevent the undue accumulation of errors and thereby control and localize the minor errors.

Ans $\quad \times{ }^{1}$. Both statements are incorrect.
$\checkmark$ 2. Statement A is correct and B is incorrect.
$X$ 3. Statement $B$ is correct and $A$ is incorrect.
$X 4$. Both statements are correct.
Q. 47 A cantilever beam is subjected to a point load and uniformly distributed load with intensity $1 \mathrm{kN} / \mathrm{m}$ shown in the figure, calculate the shear force at point C .


Ans
X 1.1 .5 kN
X 2. 1 kN
$\times 3.3 \mathrm{kN}$
4. 2 kN
Q. 48 Which of the following is NOT a dissolved impurity present in water?

Ans
$X$ 1. Hydrogen sulphide
$\checkmark$ 2. Silt
X 3. Salts
X 4. Nitrates
Q. 49 The cross section of a prismatic compass is shown in figure, identify the part numbered as 13 .


Ans
$X$ 1. Prism cap
$x$ 2. Lifting lever
$X^{3}$. Focusing stud
4. Mirror
Q. 50 Which of the following minor losses in pipe flow is taken as $\frac{V^{2}}{2 g}$ ? Where V is the velocity of liquid in a pipe.

Ans
$X$ 1. Loss of head due to obstruction in a pipe
$\times 2$. Loss of head due to friction
$\checkmark$ 3. Loss of head at the exit of the pipe
$\times 4$.
Loss of head at the entrance of a pipe with sharp cornered entrance
Q. 51 Consider the below statements with respect to Sewer appurtenances used in the sewerage system and identify the correct answer.

Statement A: Lamphole may be located when there is a change in the direction or gradient of the sewer in between two closely spaced manholes.

Statement B: Flushing tanks shall be constructed when there is a steeper downward gradient along the alignment of the sewer line.
Ans
$X$ 1. Statement $B$ is correct and $A$ is incorrect.
$X$ 2. Both statements are incorrect.
$\checkmark$ 3. Statement A is correct and B is incorrect.
$X$ 4. Both statements are correct.
Q. 52 Consider the below statements with respect to characteristics of the bending moment diagram (BMD) for beam and identify the correct answer.

Statement A: If a beam is subjected to a uniformly distributed load throughout its span, the shape of BMD will be a cubic parabolic curve.

Statement B: If a cantilever beam is subjected to a uniformly varying load (UVL) throughout its span the maximum value of bending moment will be at a distance of $2 / 3^{\text {rd }}$ of the span measured from zero intensity of UVL.

1. Both statements are incorrect.
$X 2$. Both statements are correct.
$X$ 3. Statement $B$ is correct and $A$ is incorrect.
$X 4$. Statement A is correct and B is incorrect.
Q. 53 The specific surface of cement is a property cement used to know the $\qquad$ .
Ans
$X 1$. soundness of cement
$X$ 2. specific gravity of cement
$X$ 3. strength of cement
2. fineness of cement
Q. 54 Which of the following component of oil paint is used to thin the paint, increases the spread, and is also known as
thinner?
Ans
$X$ 1. Adulterant
$\times 2$. Vehicle
$X$ 3. Pigment
3. Solvent
Q. 55 The water content in a natural soil deposit is found to be $15 \%$, calculate the degree of saturation if its void ratio is 0.50 . Consider that the specific gravity of soil is 2.7 .

Ans

1. $75 \%$
$\times 2.92 \%$
$\times 3.98 \%$
-4. $81 \%$
Q. 56 A Pelton wheel turbine is a $\qquad$ .
Ans
$X$ 1. tangential flow reaction turbine
$\checkmark$ 2. tangential flow impulse turbine
$X$ 3. radial flow reaction turbine
$X$ 4. radial flow impulse turbine
Q. 57 Calculate the bulk modulus of an alloy body if its modulus of elasticity is found to be 180 Gpa. Consider that the Poisson's ratio of tested material is 0.25 .
Ans $\times 1.100 \mathrm{GPa}$
2. 120 GPa
$\times 3.150 \mathrm{GPa}$
X 4. 180 GPa
Q.58 Which of the following is NOT the effect of cold weather concreting?

Ans
$X 1$. Delayed hardening of concrete
$X$ 2. Freezing of water contained in the plastic concrete
$x_{3}$. Reduced rate of hydration of cement
$\checkmark 4$.
Increased heat of hydration due to rapid hardening of cement
Q. 59 As per IS 456:2000, The cross-sectional area of longitudinal reinforcement shall be not less than $\qquad$ of the gross cross-sectional area of the column and the diameter of these bars shall not be less than $\qquad$ , respectively.

Ans
$\times 1.0 .8 \%, 10 \mathrm{~mm}$
$\times$ 2. $4.0 \%, 10 \mathrm{~mm}$
, 3. $0.8 \%, 12 \mathrm{~mm}$
$\times 4.4 .0 \%, 12 \mathrm{~mm}$
Q. 60 Bernoulli's equation is not applicable when the $\qquad$ .

Ans

1. flow is rotational
$\times 2$. flow is incompressible
$X$ 3. fluid is ideal
$X$ 4. flow is steady
Q. 61 In a traverse surveying, the direction of a line $P Q$ of length 320 m measured in the whole circle bearing system is found to be $30^{\circ} 00^{\prime}$. Calculate its departure.
Ans $\quad \times 1.125 .27$
2. 160 m

X 3. 277.12 m
X4. 320 m
Q. 62 Consider the below statements with respect to unit operations employed in water treatment and identify the correct answer.

Statement A: Objectionable gases such as carbon dioxide, hydrogen sulphide and other volatile odorous substances present in water can be removed by the bubble aeration technique.

Statement B: Chemical coagulation technique removes the suspended and colloidal impurities present in water.
Ans

1. Statement A is correct and B is incorrect.
2. Statement B is correct and A is incorrect.

จ 3. Both statements are correct.
$X$ 4. Both statements are incorrect.
Q. 63 Consider the below statements with respect to retaining walls subjected to earth pressure and identify the correct answer. (Assume identical conditions for the soil)

Statement A: Active earth pressure is developed when the wall moves away from the backfill.
Statement B: The active earth pressure is greater than the earth pressure at rest.
Ans
$X$ 1. Statement B is correct and A is incorrect.
$\times 2$. Both statements are correct.
, 3. Statement A is correct and B is incorrect.
$X$ 4. Both statements are incorrect.
Q. 64 The self-cleansing velocity of a sewer with a diameter of 30 cm to 60 cm is:

Ans

1. $75 \mathrm{~cm} / \mathrm{sec}$

X 2. $65 \mathrm{~cm} / \mathrm{sec}$
$\times$ 3. $55 \mathrm{~cm} / \mathrm{sec}$
$\times 4.45 \mathrm{~cm} / \mathrm{sec}$
Q. 65 As per IS 456: 2000, nominal cover to reinforcement in reinforced concrete structures, to meet the durability requirements in extreme exposure conditions shall not be less than $\qquad$
Ans

1. 50 mm
2. 75 mm
$\times$ 3. 25 mm
$\times 4.15 \mathrm{~mm}$
Q. 66 A circular shaft of 40 mm diameter is required to transmit torque from one shaft to another. Find the safe torque, which the shaft can transmit if the shear stress is not to exceed 32 Mpa .

Ans

1. $1.28 \pi \times 10^{5} \mathrm{~N}-\mathrm{mm}$

X 2. $2.25 \pi \times 10^{5} \mathrm{~N}-\mathrm{mm}$
X 3. $0.75 \pi \times 10^{5} \mathrm{~N}-\mathrm{mm}$
X4. $2.56 \pi \times 10^{5} \mathrm{~N}-\mathrm{mm}$
Q. 67 French polish is a type of $\qquad$ used to hide the grain defects on hardwood substances.
Ans

1. spirit varnish
$\times 2$ asphalt varnish
X 3. flat varnish
$X$ 4. water varnish
Q. 68 Calculate the specific gravity of a liquid if its density is $830 \mathrm{~kg} / \mathrm{m}^{3}$. Take density of water as $1000 \mathrm{~kg} / \mathrm{m}^{3}$.

Ans

1. 0.830
$\times 2.1 .320$
$\times 3.1 .200$
$\times 4.0 .814$
Q. 69 Which of the following is NOT a grading characteristic estimated from the particle size distribution curve of a soil?

Ans
$X$ 1. Uniformity coefficient
2. Coefficient of compressibility
$X$ 3. Effective size
$X$ 4. Coefficient of curvature
Q. 70 According to IS 12269:2013, insoluble residues in OPC 53 grade cement shall not be greater than $\qquad$ by mass.

Ans
X1.3\%
X2. $2 \%$
X 3. $1.5 \%$

- $4.4 \%$
Q. 71 Which of the following statements is INCORRECT with respect to the water distribution system?

Ans
Less number of cut-off valves are necessary in the case of a circular distribution system when compared to dead end
system.
$\times 2$.
Sediments accumulate due to stagnation and can cause bacterial growth in the dead-end system.
$\times 3$.
In case of repair or break down in a pipe, the area connected to that pipe will continue to receive water from another
side in the grid iron system.
$\times 4$.
Water available for firefighting will be limited since it is being supplied by only one water main in the dead-end system.
Q. 72 Calculate the modulus of rigidity for an alloy body if its modulus of elasticity is found to be 200 Gpa. Consider that the Poisson's ratio of tested material is 0.25 .

Ans

1. 80 GPa
2. 120 GPa

X 3. 600 GPa
$\times 4.100 \mathrm{GPa}$
Q. 73 According to IS 1121 (Part I):1974, the diameter or lateral dimension (distance between opposite vertical faces) of a test piece of stone used for finding its compressive strength shall not be less than $\qquad$ -.
Ans
$\times 1.75 \mathrm{~mm}$
2. 50 mm

X 3. 100 mm
$\times 4.25 \mathrm{~mm}$
Q. 74 Which of the following is NOT the role expected by fine aggregate in concrete?

Ans
$X$ 1. Fill the voids between coarse aggregates
$\times 2$. Make the concretes stiff and dense
$\checkmark$ 3. React with cement to form calcium silicate hydrate gel
$X$ 4. Improve workability of concrete
Q. 75 Which of the following expressions is correct to calculate the correction for curvature $\left(\mathrm{C}_{\mathrm{c}}\right)$ in levelling? Where, d is the
distance sighted (measured in km ).
Ans
X 1. $\mathrm{C}_{\mathrm{c}}=0.5459 \mathrm{~d}^{2} \mathrm{~m}$
$\checkmark$ 2. $\mathrm{C}_{\mathrm{c}}=0.07849 \mathrm{~d}^{2} \mathrm{~m}$
X 3. $\mathrm{C}_{\mathrm{c}}=0.6782 \mathrm{~d}^{2} \mathrm{~m}$
X 4. $\mathrm{C}_{\mathrm{c}}=0.02498 \mathrm{~d}^{2} \mathrm{~m}$
Q. 76 The inverted staff reading (back sight) taken at the soffit of a cantilever beam point A is 2.065 m . The staff reading at point $B$ (fore sight) with normally held staff is 1.250 m . The RL of point $B$ is $\qquad$
Take reduced level at point A as 100 m .
Ans

1. 96.685 m
$\times 2.100 .815 \mathrm{~m}$
$\times 3.97 .935 \mathrm{~m}$
$\times 4.99 .185 \mathrm{~m}$
Q. 77 As per IS 456:2000, the maximum area of tension reinforcement shall not exceed $\qquad$ of the gross cross sectional area of the beam.
Ans
2. $4.0 \%$
$\times 2.0 .8 \%$
$\times 3.6 .0 \%$
3. $2.5 \%$
Q. 78 A block levelling data is presented in the below figure, starting with point A at one corner and ending with T in the diagonally opposite corner. If all the grids are spaced 10 m apart in both directions, determine the position (measured from point G ) of the contour line with RL 91.5 m which intersects line GH .


Ans $\quad \times 1.4 .984 \mathrm{~m}$
$\times 2.2 .593 \mathrm{~m}$
$\times 3.6 .897 \mathrm{~m}$
4. 3.164 m
Q. 79 Calculate the crippling load of a strut of effective length 4 m according to Euler's theory for long columns, take the modulus of elasticity material used in strut section as ' E ' $\mathrm{N} / \mathrm{mm}^{2}$ and moment of inertia of strut as ' I ' $\mathrm{mm}{ }^{4}$. Consider that one end of the strut is fixed and another end is free.

Ans

1. $6.25 \Pi^{2} \mathrm{EI} \times 10^{-8} \mathrm{~N}$

X 2. $1.25 \Pi^{2} \mathrm{EI} \times 10^{-8} \mathrm{~N}$
X 3. $2.50 \Pi^{2} \mathrm{EI} \times 10^{-8} \mathrm{~N}$
X4. $5.00 \Pi^{2} \mathrm{EI} \times 10^{-8} \mathrm{~N}$
Q. 80 The average shear stress in a rectangular wooden beam 100 mm wide, 250 mm deep and 3 m long carrying a uniformly distributed load with an intensity of $40 \mathrm{kN} / \mathrm{m}$ is found to be 2.4 Mpa , calculate the maximum shear stress.

Ans
$X 1.4 .8 \mathrm{MPa}$
$\times 2.5 .2 \mathrm{MPa}$
X 3. 2.4 MPa
, 4. 3.6 MPa

[^0]Q. 1 In a certain code language, 'PENCIL' is coded as 'NKEPGR' and 'ERASER' is coded as 'TGUCTG'. How will 'CUTTER' be coded in that language?

Ans
$X$ 1. EWVVGT
$X$ 2. TGVVXF
X 3. EWVWGT
4. TGVVWE
Q. 2 Eight toddlers, C, P, D, R, E, T, U and F, are sitting around a square table, facing the centre of the table. Four of them are sitting at the corners, while four are sitting at the exact centre of the sides. U is sitting at the immediate right of P. P and E are sitting diagonally opposite to each other. R and C are sitting diagonally opposite to each other. F is sitting to the immediate right of $C$. $P$ is sitting second to the left of $C . T$ is sitting exactly between $R$ and $P$. Which toddler is sitting at the immediate left of E ?

Ans
X1. D

- 2. F

X3. C
X4. U
Q. 3 If
' $Q f^{\prime} R$ ' means ' $Q$ is the daughter of $R$ ',
' $\mathrm{Q}+\mathrm{R}$ ' means ' Q is the son of R ',
' $\mathrm{Q} \% \mathrm{R}$ ' means ' Q is the wife of R ',
' $Q$ © $R$ ' means ' $Q$ is the brother of the wife of $R$ ' and
' $\mathrm{Q} \mu \mathrm{R}$ ' means ' Q is the father of R ',
then how is N related to K in the following expression?
$\mathrm{M} \mu \mathrm{NfOf} \mathrm{P}+\mathrm{K}$
Ans
$X$ 1. Son of daughter's son
2. Daughter of son's daughter
$X$ 3. Daughter
$X$ 4. Son's daughter
Q. 4 Select the correct mirror image of the given figure when the mirror is placed at the right side.


Ans

Q. 5 Select the option that is related to the third term in the same way as the second term is related to the first term.
(The words must be considered as meaningful English words and must not be related to each other based on the number
of letters/number of consonants/vowels in the word.)
GREECE : ATHENS :: NORWAY :?
Ans

1. OSLO
$X$ 2. MADRID
$X$ 3. TOKYO
$X$ 4. NAIROBI
Q. 6 Select correct combination of mathematical signs that can sequentially replace the $\%$ signs and balance the given equation.
$35 \% 15 \% 16 \% 4 \% 3 \% 5 \% 9$
Ans $\times 1 .-,+, \div, \times,=,+$
$\times 2 .-,+, \times,=, \div,+$
3.,,$-+ \div,=, \times,+$
$\times 4 .+,-, \div, \times,=,+$
Q. 7 Select the figure from among the given options that can replace the question mark (?) in the following series.


Ans

Q. 8 Select the number from among the given options that can replace the question mark (?) in the following series.
$15,22,31,42,55$, ?
Ans $\times 1.71$
$\times 2.68$

- 3. 70
$\times 4.72$
Q. 9 Study the given diagram carefully and answer the question that follows. The numbers in different sections indicate the numbers of people with different favourite household items.


How many people's favourite household items are either only carpets or only sofa set or both?
Ans

1. 4131
$\times 2.5259$
X 3. 1870
$\times 4.3922$
Q. 10 If ' + ' means 'division', ‘-' means 'addition', ‘‘' means 'subtraction' and ‘ + ' means 'multiplication', what will be the value of the following expression?
$[\{(17 \times 12)-(3 \div 3)\}+(3-4)] \div 5$
Ans
$\times 1.5$
$\times 2.15$
$\times 3.1$
-4. 10

Section : Quantitative Aptitude
Q. 1 Convert $0.3 \overline{44}+0.4 \overline{53}-0.6 \overline{8}$ into a vulgar fraction.

Ans
-1. $\frac{6}{55}$
$\times 2 \cdot \frac{13}{55}$
X 3. $\frac{9}{55}$
X4. $\frac{12}{55}$
Q. 2 If A and B can complete a piece of work in 40 days, B and C can complete it in 60 days, A and C can complete it in 50 days. In how many days can B alone complete it (correct to one decimal place)?
Ans

1. 92.3
$\times 2.75 .5$
$\times 3.90 .4$
$\times 4.85 .6$
Q. 3 What is the area (in $\mathrm{cm}^{2}$ ) of the shaded region in the given figure, if $\mathrm{PR}=35 \mathrm{~cm}, \mathrm{PQ}=12 \mathrm{~cm}$ and O is the centre of the circle (use $\pi=3.14$ )?


Ans
$\times 1.330 .0125$
$\times 2.328 .4525$

- 3. 327.3325
$\times 4.329 .1725$
Q. 4 The expenditure of a person is $70 \%$ of his income. His income increased by $12 \%$ and he increased his expenditure by $7.5 \%$. What is the percentage increase in his savings?

Ans
X1. $21.5 \%$
X2. $24.5 \%$

- 3. $22.5 \%$

X4. $23.5 \%$
Q. $5(9)^{3 / 2} \div(8)^{-2 / 3}+3 \div 10 \times 2$ is equal to:

Ans

1. 108.6
$\times 2.106 .6$
$\times 3.107 .6$
$\times 4.109 .6$
Q. 6 The average of the first 15 multiples of 15 is:

Ans
-1. 120
$\times 2.130$
$\times 3.140$
$\times 4.110$
Q. 7 A car travels the first one-fourth distance at a speed $40 \mathrm{~km} / \mathrm{h}$, the second one-fourth distance at a speed of $50 \mathrm{~km} / \mathrm{h}$, the third one-fourth distance at a speed of $60 \mathrm{~km} / \mathrm{h}$ and the last one-fourth distance at a speed of $70 \mathrm{~km} / \mathrm{h}$. The average speed (in $\mathrm{km} / \mathrm{h}$ ) of the car for the whole journey is (correct to two decimal places):
Ans

1. 55.32
$\times 2.54 .33$
$\times 3.53 .12$
$\checkmark 42.66$
Q. 8 Greeshma bought 10 kg pasta for ₹ 50 per $\mathrm{kg}, x \mathrm{~kg}$ pasta for ₹ 60 per kg and $(x-3) \mathrm{kg}$ pasta for ₹ 65 per kg . She mixed all the types of pasta together and the average cost price of 1 kg pasta was $₹ 57.20$. What is the quantity of pasta (in kg ) that was bought at ₹ 65 per kg ?
Ans
2. 9
$\times 2.7$
-3. 6
$\times 4.8$
Q. 9 The base area of a cone is $186.34 \mathrm{~cm}^{2}$. If the height of the cone is nine-sevenths of its radius, then its volume (in $\mathrm{cm}^{3}$ )
is:
Ans $\quad \times 1.611 .657$
$\times 2.612 .754$
ง. 614.922
$\times 4.613 .841$
Q. 10 The manufacturer of a certain item can sell all he can produce at the selling price of ₹ 80 each. It costs him ₹ 60 in materials and labour to produce each item and he has overhead expenses of ₹ 5,000 per week in order to operate the plant. The number of units he should produce and sell in order to make a profit of at least ₹ 15,000 per week is:
Ans
X 1.1100
$\checkmark 2.1000$
$\times 3.1150$
$\times 4.1050$

Section : General Awareness
Q. 1 Who has been appointed as the Vice Chief of Air Staff as of February 2023?

Ans $\quad \times 1$. Air Marshal BK Khanna
2. Air Vice Marshal Satyendra Jaytee
3. Air Marshal Deshmukh SK
4. Air Marshal AP Singh
Q. 2 On the basis of the presence of major pigments, the algae are mainly divided into three classes, which are green algae, brown algae and

Ans
$X$ 1. black algae
2. red algae
$\times$ 3. grey algae
$\times 4$. white algae
Q. 3 Certain goods like national defence, roads and government administration are referred to as

Ans
$X$ 1. foreign goods
2. public goods

X 3. stored goods
X 4. private goods
Q. 4 Who is the author of a unique Buddhist text, which is a section of the Sutta Pitaka and is a compilation of verses that shed light on women's social and spiritual experiences?
Ans
X 1. Varundata
X 2. Brahman
X 3. Devta
4. Bhikkhunis
Q. 5 In the context of demonetisation by the Government of India in November 2016, till which date were old currency notes acceptable as legal tender at petrol pumps, government hospitals and payment of government dues, like taxes, power bills?
Ans
X 1. 1st December 2016
X 2. 31st December 2016

* 3.12th December 2016

X 4. 31st March 2017
Q. 6 Which Article of the Constitution explicitly clarifies that a policy like reservation will NOT be seen as a violation of right to equality?

Ans

1. Article 16 [4]

X 2. Article 17
$X$ 3. Article 22 [2]
X 4. Article 12
Q. 7 According to Koeppen climate types, which group has the characteristics of winter dry season, no dry season and monsoonal, short dry season with letter codes Aw, Af and Am, respectively?
Ans
$X$ 1. Cold Snow-forest Climates
X 2. Cold Climates
X 3. Dry Climate4. Tropical Humid Climate
Q. 8 'Pullela Gopichand', an Indian sportsperson, belongs to which game?

Ans $\quad$ 1. Basketball

- 2. Badminton
$X$ 3. Athletics

4. Football
Q. 9 Who was the chairperson of Second Backward Classes Commission that was assigned by the government in 1979?

Ans
$X$ 1. CP Mandal
X 2. Jayakishore Akrudi
3. BP Mandal

X 4. Rajashekharan Reddy
Q. 10 From which year is each district having a criminal court and a civil court in the system of justice, which was established in the new administration formation?

Ans $\times 1.1771$
X 2.1770

- 3.1772
$\times 4.1773$


## Section : English Language

Q. 1 Select the most appropriate meaning of the given idiom.

Nip in the bud
Ans
$X$ 1. Punish the opposition
X 2. Fight with someone younger
3. Suppress something at an early stage
$X 4$. Hide a secret
Q. 2 Select the most appropriate option to fill in the blank.

Avika helped her sister $\qquad$ a cardboard house for her school project.
Ans
$X 1$. made
$X 2$. has made3. make

X 4.makes
Q. 3 Select the most appropriate synonym of the word given in brackets to fill in the blank.

He returned from America when he heard that his father was $\qquad$ (indisposed) and wanted to see him.

Ans
$X 1$. healthy
2. ailing
$\times 3$. willing
X 4. merry
Q. 4 The following sentence has been divided into parts. One of them may contain a spelling error. Select the part that contains the error from the given options. If you don't find any error, mark
'No error' as your answer.
The octogenarian king / passed on the mantle of athaority / to his eldest son.
Ans
$X$ 1. to his eldest son
$X$ 2. The octogenarian king
X 3. No error
4. passed on the mantle of athaority
Q. 5 Select the most appropriate meaning of the given idiom.

To flog a dead horse
Ans

1. To waste energy on a lost cause
$X$ 2. To exhibit one's anger on something
X 3. To undertake a foolish activity
2. To beat a horse and cause it to die
Q. 6 Select the most appropriate option to fill in the blank

They went to Ramnagar $\qquad$ boat and stayed there for the weekend.

Ans
$\times$ 2. from
$\times 3$ in
X 4. with
Q. 7 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the correct order to form a meaningful and coherent paragraph.
A. So Magpie got them all together and began to show them how to do it.
B. "Ah ha!" said Thrush, and away she flew; so Thrush still builds her nest out of mud.
C. Long ago, all the birds came to Magpie and asked her to teach them how to build nests.
D. First, she took some mud and patted it into the shape of a pancake.

Ans

1. CADB
$\times 2$. ACDB
X 3. CBAD
X 4. BDCA

## Comprehension:

Read the given passage and answer the questions that follow.
When the first episode of 'Homicide: Life on the Street' aired on US network NBC on 31st January 1993, the crime drama looked like very little on TV at the time. The series was based on David Simon's book 'Homicide: A Year on the Killing Streets', which documented his time spent with the homicide unit of Baltimore Police Department; Simon would go on to create The Wire, still regarded as one of the best TV dramas ever made, but having started his career as a reporter, he made his name with this vividly written account of his time shadowing a shift of homicide detectives in 1988 as they investigated murders. As with his book, the show captured the day-to-day reality and often grim humour of a group of people whose job puts them in regular proximity with death.
Homicide strove to be authentic. It was shot on location in Baltimore and the city, its harbour, rowhouses and corners would become an integral part of the show. The detectives in Simon's book were on-hand to provide advice. "We learned a lot from those fellows," says Melissa Leo, who played detective Kay Howard, and would later win an Oscar for her role in David O'Russell's The Fighter. Early on Simon took the cast to visit various drug hangouts around the city, recalls Kyle Secor, who played rookie detective Tim Bayliss. Even the filing cabinets in the squad room were filled with old police reports. The police department was being computerized, so the set designer was able to acquire them.

SubQuestion No : 8
Q. 8 Who played the role of Kay Howard in Homicide?

Ans

1. Melissa Leo

X 2. David O'Russell
X 3. Kyle Secor
4. Tim Bayliss


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SubQuestion No: 9
Q. 9 Which statement is NOT true according to the passage?

X 1. The cabinets in the squad room shown in the TV series had real police reports.
$X$ 2. The real detectives were there to advise the actors when the TV series was being shot.
$X$ 3. The locations of the TV series Homicide were all real locations in The city of Baltimore.
4. The crime drama dominated the American TV before the Homicide was aired.

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SubQuestion No: 10
Q. 10 The passage is mainly about:
$X$ 1. the book 'Homicide: A Year on the Killing Streets'
$X$ 2. The Wire - the best TV drama
X 3. David Simon, the author
4. the TV show 'Homicide: Life on the Street'


[^0]:    Section : Reasoning

