Q-1 Aditya-L1 is dedicated mission of ISRO to study ------.

A Moon
B Mars
C Jupiter
D Sun

Correct Answer : D

Q-2 The Indus water treaty which has recently been suspended was between India and ---------.

A China
B Pakistan
C Bangladesh
D Nepal

Correct Answer : B

Q-3 Cellular jail is located in --------.

A Goa
B Shaheed dweep
C Pune
D Sri Vijaya Puram

Correct Answer : D

Q-4 The ratio of Sun's distance from earth to the diameter of Sun is approximately ---------.

A 100
B 104
C 108
D 112

Correct Answer : C

Q-5 As per the latest data released by the IMF World Economic Outlook, position of India among World largest economies is expected to be at ---------- in May/June 2025.

A 4th
B 5th
C 6th
D 3rd

Correct Answer : A

Q-6 What is the missing number in sequence 4,8,14,22,32,--------?

A 42
B 44
C 46
D 48

Correct Answer : B

Q-7 Choose the correct passive form of the sentence given below:
Had the police arrested the burglar.

A Had the burglar been arrested by the police.
B Have the burglar been arrested by the police.
C The burglar has been arrested by the police.
D Had the burglar was arrested by the police.

Correct Answer : A

I can't find my _____ bag.

Q-8

A lose

B loosing

C lost

D left

Correct Answer : C

Q-9 Identify the word which is similar in the meaning to the phrase (in inverted commas) of the sentence:
When she heard the news, she was "like a dog with two tails".

A very greedy

B very enthusiastic

C very morose

D very happy

Correct Answer : D

Q-10 Let's wait until it _____ raining.

A stops

B stopped

C stopping

D stop

Correct Answer : A

Q-11 Which element has the largest atomic radius?

A Li

B Na

C F

D I

Correct Answer : D

Q-12 In the following reaction, what happens to Mn ? It undergoes

$$2KMnO_4 + 5H_2C_2O_4 + 3H_2SO_4 \longrightarrow 2MnSO_4 + 10CO_2 + 8H_2O + K_2SO_4$$

A reduction

B oxidation

C Loss of electron

D no change

Correct Answer : A

Q-13 The correct order of orbitals in which electrons are filled is?

A 3d, 4s, 4p, 4d

B 4s, 3d, 4p, 5s

C 5s, 4p, 3d, 4d

D 3d, 4p, 4s, 4d

Correct Answer : B

Q-14 Which of the following is incorrect about 's' orbitals?

A They are spherical in shape

B They are found in all principal energy levels

C They can only hold one electron

D None of these

Correct Answer : C

Q-15 Which pair of metals has the same electronic configuration

A Cr^{3+}, Fe^{3+}

B Mn^{2+}, Fe^{3+}

C V^{3+}, Cr^{3+}

D Mn^{2+}, Ni^{2+}

Correct Answer : B

Q-16 The hybridisation of S in SF_6 molecule is

A **sp^3d^2**
B dsp^3
C d^2sp^3
D sp^3

Correct Answer : A

Q-17 Among the following compounds which one is most ionic?

A BeS
B BCl_3
C **$MgCl_2$**
D Al_2O_3

Correct Answer : C

Q-18 Which element has the highest first ionization energy?

A O
B **N**
C C
D B

Correct Answer : B

Q-19 The chemical formula of ammonium phosphate is

A $(NH_4)PO_4$
B $(NH_4)_2PO_4$
C **$(NH_4)_3PO_4$**
D None of these

Correct Answer : C

Q-20 Arrange the following in increasing order of their bond order He_2, O_2 , N_2 and NO

A $He_2<O_2<N_2<NO$
B $He_2>O_2>N_2>NO$
C $He_2<N_2<NO<O_2$
D **$He_2<O_2<NO<N_2$**

Correct Answer : D

Q-21 Which of the following is scalar physical quantity?

A Velocity
B Acceleration
C **Speed**
D Momentum

Correct Answer : C

Q-22 Newton's first law of motion is also known as:

A **Law of inertia**
B Law of acceleration
C Law of action-reaction
D Law of gravitation

Correct Answer : A

Q-23 If m is mass of the displaced object, x is displacement and k is spring constant, then the restoring force (F) in SHM (Simple harmonic motion) is given by:

A F = kx
B **F = -kx**
C F = ma
D F = mv

Correct Answer : B

Q-24 The distance between two consecutive crests or troughs in a transverse wave is called

A Amplitude
B Frequency
C Time period
D **Wavelength**

Correct Answer : D

Q-25 The ability of material to return to its original state after deformation is called:

A Plasticity

B Elasticity

C Ductility

D Malleability

Correct Answer : B

Q-26 Bernoulli's principle is based on the conservation of...

A Mass

B Momentum

C Charge

D Energy

Correct Answer : D

Q-27 The majority charge carriers in p-type semiconductor are....

A Electrons

B Holes

C Protons

D Positrons

Correct Answer : B

Q-28 The process of adding impurities to a semiconductor is called

A Diffusion

B Ionization

C Doping

D Recombination

Correct Answer : C

Q-29 Which quantum number is used to find energy of electron in an energy level

A Principle quantum number (n)

B Azimuthal quantum number (l)

C Magnetic quantum number (m)

D Spin quantum number (s)

Correct Answer : A

Q-30 Which of the following is not emitted during a radioactive decay?

A Alpha particle

B Gamma rays

C Beta particle

D Neutron

Correct Answer : D

Q-31 How many different ways can a team of five people be formed from a total of ten people so that two specific people are included in each team ?

A 56

B 55

C 57

D 58

Correct Answer : A

Q-32 The principal solutions of the equation $\sin x = \frac{-1}{\sqrt{2}}$ are

A $\frac{3\pi}{4}, \frac{5\pi}{4}$

B $\frac{5\pi}{4}, \frac{7\pi}{4}$

C $\frac{3\pi}{2}, \frac{5\pi}{2}$

D $\frac{3\pi}{4}, \frac{7\pi}{4}$

Correct Answer : B

Q-33 Evaluate the integral $\int \log(x)\, dx$

A $\frac{1}{x} + C$

B $x(\log x - 1) + C$

C $\log x + 1 + C$

D $\log x + \frac{1}{x} + C$

Correct Answer : B

Q-34 The order and the degree of the differential equation $\frac{d^4y}{dx^4} - x^2\left(\frac{d^2y}{dx^2}\right)^{\frac{1}{2}} = 0$ are

A 2,4

B 4,1

C 4,2

D 2,2

Correct Answer : C

Q-35 The solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$ is

A $y = \frac{x^4}{2} + \frac{C}{x}$

B $y = \frac{x^2}{2} + C$

C $y = \frac{x^4}{4} + \frac{C}{x}$

D $y = \frac{x^3}{4} + \frac{C}{x}$

Correct Answer : D

Q-36 If the mean of certain set of data is 25 and variance is 16, then the coefficient of variance is

A 15

B 16

C 17

D 18

Correct Answer : B

Q-37 For the matrix $M = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find the value of a and b such that $M^2 + aM + bI = 0$.

A a=4,b=1

B a=1,b=4

C a=-4,b=1

D a=4,b=-4

Correct Answer : C

Q-38 If the matrix $\begin{bmatrix} 1+x & 3 & 0 \\ 1 & -1 & 2 \\ 2x & 1 & -5 \end{bmatrix}$ is singular, the value of x is

A 6/5

B 5/6

C (-5)/6

D (-6)/5

Correct Answer : D

Q-39 Find the equation of the line in cartesian form that passes through the point with position vector $2\hat{\imath} - \hat{\jmath} + 4\hat{k}$ and is in the direction $\hat{\imath} + 2\hat{\jmath} - \hat{k}$.

A $\frac{x-1}{2} = \frac{y-2}{-1} = \frac{z+1}{4}$

B $\frac{x-2}{1} = \frac{y+1}{2} = \frac{z-4}{-1}$

C $\frac{x-1}{1} = \frac{y+1}{2} = \frac{z-4}{-1}$

D $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z+1}{1}$

Correct Answer : B

Q-40 If a line has direction ratios 2,-1,-2, determine its direction cosines

A $\frac{2}{9}, \frac{-1}{9}, \frac{-2}{9}$

B $\frac{-2}{9}, \frac{1}{9}, \frac{2}{9}$

C $\frac{2}{5}, \frac{-1}{5}, \frac{-2}{5}$

D $\frac{2}{3}, \frac{-1}{3}, \frac{-2}{3}$

Correct Answer : D

Q-41 Poisson's ratio is defined as the ratio of

A Axial stress to lateral strain

B Lateral strain to axial strain

C Axial strain to lateral strain

D Lateral stress to axial stress

Correct Answer : B

Q-42 A mild steel specimen is under uniaxial tensile stress. Young modulus and yield stress for mild steel are 2 x 10^5 MPa and 250 MPa, respectively. The maximum amount of strain energy per unit volume that can be stored in this specimen without a permanent set is

A 0.156 N-mm/mm³

B 156 N-mm/mm³

C 1.56 N-mm/mm³

D 15.6 N-mm/mm³

Correct Answer : A

Q-43 For a simple supported beam on two end supports, the bending moment is the maximum

A Always at the mid-span

B Where there is no shear force

C Usually on the supports

D Where the deflection is maximum

Correct Answer : B

Q-44 In a composite section under axial loading, the total deformation is

A **Same for all materials**
B Zero
C Different for each material
D Infinite

Correct Answer : A

Q-45 A prismatic bar of uniform cross-section is subjected to axial load. The stress is

A **Uniform throughout the section**
B Varying along the length
C Zero at the center
D Maximum at the ends

Correct Answer : A

Q-46 A material is called isotropic if

A It has different properties in all directions
B **It has the same properties in all directions**
C It has no elasticity
D It has no plasticity

Correct Answer : B

Q-47 A steel bar 2 m long, 20 mm wide and 15 mm thick is subjected to a tensile load of 30 kN. If Poisson's ratio is 0.25 and young's modulus is 200 GPa, an increase in volume will be

A 160 mm^3
B **150 mm^3**
C 140 mm^3
D 130 mm^3

Correct Answer : B

Q-48 A uniformly distributed load (UDL) has

A Point load at the center
B **Load distributed over the entire span**
C Load acting at a single point
D Zero reaction

Correct Answer : B

Q-49 Shear force at the midpoint of a simply supported beam under a UDL is

A Maximum
B Minimum
C **Zero**
D Depends on beam length

Correct Answer : C

Q-50 Deflection in a simply supported beam under UDL is maximum at

A Support
B End
C Anywhere
D **Center**

Correct Answer : D

Q-51 If an element of a stressed body is in a state of pure shear with a magnitude of 96 N/mm^2, the magnitude of maximum principal stress at that location is

A 125 N/mm^2
B 76 N/mm^2
C 114 N/mm^2
D **96 N/mm^2**

Correct Answer : D

Q-52 The neutral axis of a beam is the axis where

A Maximum stress occurs
B Minimum stress occurs
C Zero stress occurs
D Shear stress is maximum

Correct Answer : C

Q-53 A singly reinforced beam is reinforced in

A Tension zone only
B Compression zone only
C Both tension and compression zones
D None of the above

Correct Answer : A

Q-54 The purpose of lateral ties in a column is to

A Provide confinement to the core concrete
B Resist bending
C Increase deflection
D Reduce load carrying capacity

Correct Answer : A

Q-55 Which type of footing is used for heavy column loads?

A Isolated footing
B Combined footing
C Raft footing
D Strap footing

Correct Answer : C

Q-56 Correction due to sag in tape is always

A Added
B Subtracted
C Ignored
D None of the above

Correct Answer : B

Q-57 The most accurate method of linear measurement is

A Pacing
B Chain surveying
C Tacheometry
D Electronic distance measurement (EDM)

Correct Answer : D

Q-58 The instrument used for setting out right angles in chain surveying is

A Dumpy level
B Optical square
C Theodolite
D Plane table

Correct Answer : B

Q-59 In a surveyor's compass, the readings are taken in:

A Whole circle bearing
B Quadrantal bearing
C None of these
D Both WCB and QB

Correct Answer : B

Q-60 Local attraction in compass surveying occurs due to:

A Human error
B Instrumental defects

C **Nearby magnetic substances**

D Incorrect readings

Correct Answer : C

Q-61 A benchmark is used for

A Measuring distances

B Establishing reference elevation

C Determining angles

D None of these

Correct Answer : B

Q-62 The rise and fall method in leveling is used to

A Calculate elevations

B Measure angles

C Find distances

D None of these

Correct Answer : A

Q-63 A negative declination means that the magnetic meridian is towards

A East of the true meridian

B West of the true meridian

C North of the true meridian

D South of the true meridian

Correct Answer : B

Q-64 Which part of a theodolite helps in focusing the cross-hairs?

A Telescope

B Vertical clamp

C Diaphragm

D Eyepiece

Correct Answer : D

Q-65 Swinging the telescope in a theodolite means rotating it

A Vertically

B Horizontally

C Both horizontally and vertically

D None of these

Correct Answer : B

Q-66 Which of the following is NOT a classification of roads as per IRC?

A Expressways

B National Highways

C Regional Highways

D Village Roads

Correct Answer : C

Q-67 The three main elements of a traffic system are

A Vehicles, Roads, Environment

B Roads, Vehicles, Traffic Control Devices

C Roads, Drivers, Vehicles

D Roads, Traffic Signs, Signals

Correct Answer : C

Q-68 Which traffic study is conducted to determine the number of vehicles passing a point?

A Spot speed study

B Traffic volume study

C Origin-destination study

D Parking study

Correct Answer : B

Q-69 PCU stands for

A **Passenger Car Unit**
B Public Car Unit
C Parking Capacity Unit
D Peak Congestion Unit

Correct Answer : A

Q-70 The penetration test on bitumen determines its

A Softening point
B **Hardness**
C Ductility
D Viscosity

Correct Answer : B

Q-71 CBR test is used to evaluate

A Traffic Volume
B Road Maintenance Needs
C **Strength of Subgrade Soil**
D Speed of Vehicles

Correct Answer : C

Q-72 While designing a hill road with a ruling gradient of 6 %, if a sharp horizontal curve of 50 m radius is encountered; the compensated gradient at the curve as per the Indian Roads Congress specifications should be

A 5.5
B **4.5**
C 5.0
D 6.0

Correct Answer : B

Q-73 The standard gauge in Indian Railways is

A **1.676 m**
B 1.000 m
C 0.610 m
D 1.435 m

Correct Answer : A

Q-74 The major factor affecting pavement design is

A Wind speed
B Temperature
C **Traffic load**
D Rainfall

Correct Answer : C

Q-75 Expansion joints are provided in

A Flexible pavements
B **Rigid pavements**
C Gravel roads
D None of these

Correct Answer : B

Q-76 Which type of foundation is suitable for black cotton soil?

A Raft foundation
B Well foundation
C Isolated footing
D **Pile foundation**

Correct Answer : D

Q-77 The thickness of mortar in brick masonry should be

A 5 mm
B 10 mm
C 15 mm
D 20 mm

Correct Answer : B

Q-78 Which bond is the strongest in brick masonry?

A English bond
B Flemish bond
C Stretcher bond
D Header bond

Correct Answer : A

Q-79 The process of leveling the surface before laying flooring is called

A Compacting
B Screeding
C Grouting
D Tamping

Correct Answer : B

Q-80 The process of compacting concrete is done to

A Remove air voids
B Increase setting time
C Reduce hydration
D Increase weight

Correct Answer : A

Q-81 The ultimate load capacity of a 10 m long concrete pile of square cross-section 500 mm x 500 mm driven into a homogeneous clay layer having an undrained cohesion value of 40 kPa is 700 kN. If the cross-section of the pile is reduced to 250 mm x 250 mm and the length of the pile is increased to 20 m, the ultimate load capacity will be

A 722.5 kN
B 350 kN
C 1400 kN
D 632.5 kN

Correct Answer : D

Q-82 What is the ideal water-cement ratio for concrete?

A 0.20
B 0.40
C 0.80
D 1.00

Correct Answer : B

Q-83 The shear strength of soil depends on

A Cohesion
B Angle of internal friction
C Both cohesion and angle of internal friction
D None of these

Correct Answer : C

Q-84 Permeability of soil is measured using

A Permeameter
B Oedometer
C Pycnometer
D None of these

Correct Answer : A

Q-85 The two criteria for the determination of allowable bearing capacity of a foundation are

A Bond failure and shear failure
B Settlement and tensile failure

C **Settlement and shear failure**

D Compression failure and tensile failure

Correct Answer : C

Q-86 Compressibility of a fluid is defined as

A **Change in density with pressure**

B Change in volume with temperature

C Ratio of mass to volume

D Resistance to flow

Correct Answer : A

Q-87 Water flows through a 100 mm diameter pipe with a velocity of 0.015 m/sec. If the kinematic viscosity of water is 1.13 x 10^{-6} m^2/sec, the friction factor of the pipe material is

A 0.032

B **0.048**

C 0.015

D 0.027

Correct Answer : B

Q-88 Two samples of water A and B have pH values of 4.4 and 6.4 respectively. Then how many times sample A is more acidic than sample B?

A **100**

B 200

C 50

D 150

Correct Answer : A

Q-89 In a BOD test, 5 ml of waste is added to 295 ml of aerated pure water. Initial dissolved oxygen (DO) content of the diluted sample is 7.8 mg/l. After 5 days of incubation at 20°C, the DO content of the sample is reduced to 4.4 mg/l. The BOD of the waste water is

A **204**

B 196

C 200

D 190

Correct Answer : A

Q-90 Pascal's Law states that

A Pressure increases with depth in a fluid

B **A change in pressure applied to an enclosed fluid is transmitted undiminished throughout the fluid**

C The pressure at any point in a fluid is always the same

D None of these

Correct Answer : B

Q-91 A simple manometer is used to measure

A Absolute pressure

B **Gauge pressure**

C Differential pressure

D Atmospheric pressure

Correct Answer : B

Q-92 An imaginary curve drawn through a flowing fluid in such a way that the tangent to it at any point gives the direction of flow at that point is

A Streakline

B **Streamline**

C Pathline

D Streamtube

Correct Answer : B

Q-93 For a steady incompressible laminar flow between two infinite parallel stationary plates, the shear stress variation is

A **Liner with zero value at the centre**
B Quadratic with zero value at the centre
C Liner with zero value at the plates
D Quadratic with zero value at the plates

Correct Answer : A

Q-94 For laminar flow, the Reynolds number should be

A **Less than 2000**
B Between 2000 and 4000
C More than 4000
D Zero

Correct Answer : A

Q-95 Water hammer occurs due to

A Sudden opening of a valve
B **Sudden closure of a valve**
C Slow opening of a valve
D Friction loss in pipes

Correct Answer : B

Q-96 Pitot tube is used to measure

A Static pressure
B Total pressure
C **Velocity of fluid**
D Flow rate

Correct Answer : C

Q-97 An agricultural land of 437 ha is to be irrigated for a particular crop. The base period of the crop is 90 days and the total depth of water required by the crop is 105 cm. If rainfall of 15 cm occurs during the base period, the duty of irrigation water is

A **864 ha/cumec**
B 486 ha/cumec
C 52 ha/cumec
D 556 ha/cumec

Correct Answer : A

Q-98 The direct runoff hydrograph of a storm obtained from a catchment is triangular in shape and has a base period of 80 hours. The peak flow rate is 30 m^3/sec and catchment area is 86.4 km^2. The rainfall excess that has resulted the above hydrograph is

A 10 cm
B **5 cm**
C 9 cm
D 14 cm

Correct Answer : B

Q-99 Bernoulli's theorem is based on the conservation of

A Mass
B **Energy**
C Momentum
D Volume

Correct Answer : B

Q-100 Which one is not a unit of pressure?

A Pascal
B N/m^2
C **kg/m^3**
D atm

Correct Answer : C