



Q-1 Weight of the body in air is 800 N and if the weight of the body in water is 500 N. What will be the approx. volume in m^3 of the body? (Neglect the density of air.)

- A **0.030** B 0.30
C 0.013 D 0.130

Correct Answer : A

Q-2 The ratio of c_p/c_v for air is assumed to be

- A 1.33 B **1.4**
C 1.66 D 1.00

Correct Answer : B

Q-3 A piston cylinder contains air at 600 kPa, 290 K and a volume of $0.01 m^3$. A constant pressure process gives 54 kJ of work output. Find the final volume of the air.

- A $0.01 m^3$ B $0.08 m^3$
C **$0.1 m^3$** D $0.8 m^3$

Correct Answer : C

Q-4 A two-dimensional fluid element rotates like a rigid body. At a point within the element, the pressure is 1 unit. Radius of the Mohr's circle, characterizing the state at that point, is

- A 2 unit B 1 unit
C 0.5 unit D **0 unit**

Correct Answer : D

Q-5 A solid circular shaft of 60 mm diameter transmits a torque of 1600Nm. The value of maximum shear stress developed is

- A **37.72 MPa** B 47.72 MPa
C 57.72 MPa D 67.72 MPa

Correct Answer : A

Q-6 For a simply supported beam on two end supports, the bending moment is maximum

- A always at mid span B usually on the supports
C **where there is no shear force** D where the deflection is maximum

Correct Answer : C

Q-7 A metallic rod of 500 mm length and 50 mm diameter, when subjected to a tensile force of 100 kN at the ends, experiences an increase in its length by 0.5 mm and a reduction in its diameter by 0.015 mm. The poisson's ratio of the rod material is

- A 0.2 B **0.3**
C 0.4 D 0.5

Q-8 The number of degrees of freedom of a planar linkage with 10 links and 12 simple revolute joints is

- A 1
 B 2
 C 3
 D 4

Correct Answer : C

Q-9 There are two points P and Q on a planar rigid body. The relative velocity between the two points

- A should always be along PQ
 B should always be perpendicular to PQ
 C can be oriented along any direction
 D should be along QP when the body undergoes pure translation

Correct Answer : B

Q-10 In a system subjected to damped forced vibrations, the ratio of maximum displacement to the static deflection is known as

- A Critical damping ratio
 B Damping factor
 C Logarithmic decrement
 D Magnification factor

Correct Answer : D

Q-11 The balancing weights are introduced in planes parallel to the plane of rotation of the disturbing mass. To obtain complete dynamic balance, the minimum number of balancing weights to be introduced in different planes is

- A 1
 B 2
 C 3
 D 4

Correct Answer : B

Q-12 The angle between the direction of the follower motion and a normal to the pitch curve is called

- A pitch angle
 B prime angle
 C base angle
 D pressure angle

Correct Answer : D

Q-13 The divergence of a vector function $\bar{A} =$

$$3x^2\hat{i} + 5xy^2\hat{j} + xyz^3\hat{k}$$

- A $6x^2 + 10xy + 3xyz$
 B $6x^2\hat{i} + 10xy\hat{j} + 3xyz\hat{k}$
 C $6x + 10xy + 3xyz^2$
 D $6x + 5xy + 3xyz^2$

Correct Answer : C

Q-14 Laplace transform of $\delta(t-a)$ is

- A $e^{\delta s}$
 B e^{as}
 C e^{-as}
 D $e^{\delta t}$

Q-15

The order and degree of $\left(\frac{d^3y}{dx^3}\right)^2 + \left(\frac{d^2y}{dx^2}\right)^3 + y = 0$ are respectively.

- A **3, 2** B 2, 3
C 3, not defined D 3, 3

Correct Answer : A

Q-16 The point through which the whole weight of the body acts is called _____

- A Inertial point B **Centre of gravity**
C Centroid D Central point

Correct Answer : B

Q-17 If a box is lying on the floor of a wagon with a coefficient of friction 0.3, what is the maximum acceleration of the wagon for which the box would remain stationary? (Let $g = 10 \text{ m/s}^2$)

- A 0.6 m/s^2 B 6 m/s^2
C 0.3 m/s^2 D **3 m/s^2**

Correct Answer : D

Q-18 What is the formula of theorem of perpendicular axis? (I represent Moment of Inertia)

- A $I_{zz} + I_{xx} + I_{yy} = 0$ B $I_{zz} = I_{xx} + Ah^2$
C **$I_{zz} - I_{xx} = I_{yy}$** D None of the mentioned

Correct Answer : C

Q-19 How do we calculate force in a variable mass constant velocity system?

- A **$F = v(dm/dt)$** B $F = mv$
C $F = ma$ D $F = m/t$

Correct Answer : A

Q-20 The hydraulic ram is a device used

- A to accelerate water flow B **to lift water without electric motor**
C for lifting heavy loads D all of the above

Correct Answer : B

Q-21 When is orifice called 'large orifice'?

- A **If the head of liquid is less than 5 times the depth of orifice** B If the head of liquid is less than 2.5 times the depth of orifice
C If the head of liquid is less than 4 times the depth of orifice D If the head of liquid is less than 1.5 times the depth of orifice

Correct Answer : A

Q-22 Which of the following cannot be the value of absolute pressure of a fluid at any point?

A 0
C - 1 bar
B 1.013 bar
D 200 bar
Correct Answer : C

Q-23 A van der Waals bond is a _____ bond.

A Primary
C Tertiary
B Secondary
D Quaternary

Correct Answer : B

Q-24 In a crystal, if a fault exists in the arrangement at a point, it is called as _____

A space defect
C single defect
B primary defect
D point defect

Correct Answer : D

Q-25 Iron possesses BCC crystal structure above...(in degree centigrade)

A 153
C 910
B 768
D 1410

Correct Answer : D

Q-26 Which of the following restricts the flow of electrical energy?

A Superconductors
C Polar molecule
B Passive dielectrics
D Active dielectric

Correct Answer : B

Q-27 In order to generate energy in Sahara Desert where water is available in significantly low amount. Which of the following system can we employ in such a place?

A Gas Turbine
C Steam Turbine
B Tidal Engine
D Gas & Steam Engine

Correct Answer : A

Q-28 Heat transfer takes place according to which of the following law?

A Newton's second law of motion
C Newton's law of cooling
B First law of thermodynamics
D Second law of thermodynamics

Correct Answer : D

Q-29 In M/M/S: N/FIFO the following does not apply

A Poisson arrival
C Exponential service
B Limited service
D Single server

Correct Answer : D

Q-30 In network diagram, events are commonly represented by

A Arrows
C Triangles
B Nodes
D None of these

Q-31 Angle between the rake face and plane perpendicular to rake face is known as:

- A **Side rake angle** B Side relief angle
C End relief angle D Back rake angle

Correct Answer : A

Q-32 During the cutting of, discontinuous chips are formed.

- A **Brittle Material** B Ductile material
C Any material at high cutting speeds D Any material with a heavy coolant

Correct Answer : A

Q-33 In a single pass rolling process using 410 mm diameter steel rollers, a strip of width 140 mm and thickness 8 mm undergoes 10% reduction of thickness. The angle of bite in radians is

- A 0.006 B 0.031
C **0.062** D 0.600

Correct Answer : C

Q-34 When using low cutting speeds and negative rake angle tool to cut soft metals, the result is often

- A a long and continuous chip B discontinuous chip
C **a built-up edge** D a good surface finish

Correct Answer : C

Q-35 What are the preparatory functions for metric units and feed rate in mm/min to machine the work on CNC milling machine?

- A G20 G98 B G21 G98
C **G21 G94** D G20 G94

Correct Answer : C

Q-36 In the horizontal axis of a control chart displays_____

- A Sample number B Time
C Neither sample number or time D **Either sample number or time**

Correct Answer : D

Q-37 What is the abscissa of the Operating Characteristic (OC) curve?

- A Proportion of lots accepted B Proportion of lots rejected
C Acceptance number D **Fraction defectives**

Correct Answer : D

Q-38 Which of the following is not a six-sigma belt level ranking?

- A **Pink Belt** B Green Belt
C Black Belt D Yellow Belt

Correct Answer : A

Q-39 Find the number of observations required for 95% confidence level and at an accuracy of $\pm 2\%$ when the percentage of occurrence of activity is 60%?

- A **2400** B 2404
C 2440 D 2024

Correct Answer : A

Q-40 How is the maximum heart rate (MHR) roughly calculated?

- A MHR = 220 + age of the people B **MHR = 220 – age of the people**
C MHR = 210 – age of the people D MHR = 210 + age of the people

Correct Answer : B

Q-41 Risers are designed to take care of

- A Liquid shrinkage only B **Liquid & solidification shrinkage**
C Thermal shrinkage D Solidification shrinkage only

Correct Answer : B

Q-42 Which of the following is true about resistance welding?

- A **Electrodes of higher resistivity is used for lower resistive piece** B Electrodes of higher resistivity is used for higher resistive piece
C Electrodes of lower resistivity is used for lower resistive piece D Electrodes of lower resistivity is used for higher resistive piece

Correct Answer : A

Q-43 Which of the following is a step of powder metallurgy?

- A The production of metal powder B The consolidation and fusing of the powder into a solid metal
C The compaction and shaping of the powder D **All of the mentioned**

Correct Answer : D

Q-44 Which is not an element of Computer Integrated Manufacturing?

- A Marketing B **Mining**
C Product design D Warehousing

Correct Answer : B

Q-45 Which of the following materials can be machined using Electro discharge machining?

- A Heat resistant alloys B Super alloys
C Carbides D **All of the mentioned**

Correct Answer : D

Q-46 What is the limit of surface area that is to be machined using USM?

- A <100 mm² B <500 mm²
C **<1000 mm²** D <1500 mm²

Correct Answer : C

Q-47 Vacuum is the machining medium for _____

A LBM

C EBM

B WJM

D None of the mentioned

Correct Answer : A

Q-48 What is the function of the flow control valve in pneumatic system?

A Controls the direction of flow of air

C It converts the mechanical energy to hydraulic energy

B The moisture is separated and removed

D It controls the rate of flow of compressed air

Correct Answer : D

Q-49 Which among the following are not the applications of Pneumatic system?

A Aerospace

C Mining

B Packing systems

D Agriculture types of equipment

Correct Answer : B

Q-50 Prismatic model comes under which type of CAD?

A 2

C 3

B 2.5

D None of these

Correct Answer : B

Q-51 An amount is invested at 10% per annum compound interest for 2 years, and the interest earned is Rs. 840. What is the principal amount?

A Rs. 3500

C Rs. 4000

B Rs. 4500

D Rs. 5000

Correct Answer : C

Q-52 In covering a distance of 30 km, A takes 2 hours more than B. If A doubles his speed, then he would take 1 hour less than B. A's speed is:

A 5 km/h

C 9 km/h

B 7 km/h

D 10 km/h

Correct Answer : A

Q-53 Fill the blank in the middle of the following series.
SCD, TEF, UGH, _____, WKL

A CMN

C VIJ

B UJI

D IJT

Correct Answer : C

Q-54 The Chandrayaan 3 mission's rover is known as

A PSLV

C Dhruv

B Pragyaan

D Vikram

Correct Answer : B

Q-55 We were very tired, So we _____ early.

A Leave

B Leaving

C Left

D Lost

Correct Answer : C

Q-56 Consider the system of linear equations

$$x+2y-3z=-2,$$

$$3x-y+4z=3,$$

$$6x+5y+\lambda z=-3$$

where x, y, z are the variables and λ is a constant.

Then which one of the following is true ?

A If $\lambda=5$, then system has unique solution

B If $\lambda=5$, then system has infinitely many solutions

C If $\lambda=5$, then system has no solution

D System is inconsistency for any value of λ

Correct Answer : B

Q-57 Evaluate double integral $\int_0^{\infty} \int_x^{\infty} \frac{e^{-y}}{y} dy dx$.

A 0

B 1

C -2

D 2

Correct Answer : B

Q-58 Using Newton's iterative method with initial approximation $x_0 = 2$, the root of the equation $x^3 - 2x - 8 = 0$ after one iteration is

A 2.40

B 2.33

C 2.12

D 2.50

Correct Answer : A

Q-59 Find the directional derivative of $F(x, y, z) = x^2yz + 4xz^2$ at $(1, -2, -1)$ in the direction of vector $2\hat{i} - \hat{j} - 2\hat{k}$.

A $31/3$

B $35/3$

C $37/3$

D $38/3$

Correct Answer : C

Q-60 The general solution of the first order differential equation $\frac{dy}{dx} + 2y \tan x = \sin x$ is

A $y = \sin x + k \cos^2 x$

B $y = \sin x + k \sin^2 x$

C

$$y = \cos x + k \sin^2 x$$

D

$$y = \cos x + k \cos^2 x$$

Correct Answer : D

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