OSSC

Previous Year Paper

Laboratory Assistant 15

Dec, 2022

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Roll No: 221922
Registration No: OD588322
Name: BISV
Exam Date: **15-Dec-2022**
Exam Time: **13:30-15:30**
Post Name: **LAB ASSISTANT**

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Exam Day Photo

Physics - Physics

Question No.1 Marks: 4.00

Bookmark

The image formed by a Plane Mirror is always _____.

(A) ○ **Virtual (Correct Answer)** (Chosen option)
(B) ○ Enlarged
(C) ○ Real
(D) ○ Diminished

Question No.2 Marks: 4.00

Bookmark

The type of wave motion where the particles of the medium are vibrating in a direction of the direction of propagation of the wave is called _____.

(A) ○ Progressive Waves
(B) ○ Transverse Waves (Chosen option)
(C) ○ Stationery Waves
(D) ○ **Longitudinal Waves (Correct Answer)**

Question No.3 Marks: 4.00

Bookmark

The relationship between the Focal length and Radius of Curvature of a Mirror is given by _____.

(A) ○ **f = R / 2 (Correct Answer)**
(B) ○ f = 4R
(C) ○ f = 3R
(D) ○ R = f / 2 (Chosen option)

Question No.4 Marks: 4.00

Bookmark

The correct relation between Electric Field and Electric Potential is given by _____.

(A) ○ **E = - dv / dx (Correct Answer)**
(B) ○ E = V / x
(C) ○ E = Vx
(D) ○ E = dV / dx (Chosen option)

Question No.5 Marks: 4.00

Bookmark

Heat gained by the cold body will always be _____ the heat lost by the hot body.

(A) ○ **Equal to (Correct Answer)** (Chosen option)
(B) ○ Negligible to
(C) ○ Greater than
(D) ○ Lesser than

Question No.6 Marks: 4.00

Bookmark

E in LASER stands for _____.

(A) ○ Energetic

(B) ○ Ejection

(C) ○ **Emission (Correct Answer)** (Chosen option)

(D) ○ Extrapolation

Question No.7 Marks: 4.00

Bookmark

20 m/s is equal to _____ km/hr.

(A) ○ 36 km/hr

(B) ○ 60 km/hr

(C) ○ 48 km/hr

(D) ○ **72 km/hr (Correct Answer)** (Chosen option)

Question No.8 Marks: 4.00

Bookmark

Magnetic intensity, at any point lying on a line perpendicular to the length of the element is maximum when Θ = ___ degree(s).

(A) ○ 30

(B) ○ **90 (Correct Answer)**

(C) ○ 0 (Chosen option)

(D) ○ 45

Question No.9 Marks: 4.00

Bookmark

The dimensional formula for water equivalent of a substance is _____.

(A) ○ MLT (Chosen option)

(B) ○ T

(C) ○ **M (Correct Answer)**

(D) ○ L

Question No.10 Marks: 4.00

Bookmark

The number of vibrations made by the body in one second is called _____.

(A) ○ Phase

(B) ○ Time Period

(C) ○ **Frequency (Correct Answer)** (Chosen option)

(D) ○ Amplitude

Question No.11 Marks: 4.00

Bookmark

The force between any two charged particles is given by:

(A) ○ Newton's Law

(B) ○ **Coulomb's Law (Correct Answer)** (Chosen option)

(C) ○ Kepler's Law

(D) ○ Galileo's Law

Question No.12 Marks: 4.00

Bookmark

For a convex mirror, the Radius of Curvature is always _____.

(A) ○ Zero

(B) ○ **Positive (Correct Answer)** (Chosen option)

(C) ○ 1
(D) ○ Negative

Question No.13 Marks: 4.00
Bookmark

What is the SI Unit of Length?
(A) ○ Foot
(B) ○ Light year
(C) ○ **Meter (Correct Answer)** (Chosen option)
(D) ○ Centimetre

Question No.14 Marks: 4.00
Bookmark

The correct relation for the Law of Periods is _____.
(A) ○ $T \alpha R^4$
(B) ○ $T^2 \alpha R^4$
(C) ○ $T \alpha R^3$
(D) ○ **$T^2 \alpha R^3$ (Correct Answer)**

Question No.15 Marks: 4.00
Bookmark

Two identical resistors of 2 ohms are connected in parallel. The effective resistance between them is given by:
(A) ○ 3 ohm
(B) ○ 4 ohm
(C) ○ **1 ohm (Correct Answer)** (Chosen option)
(D) ○ 1.5 ohm

Question No.16 Marks: 4.00
Bookmark

Higher Frequency Waves (> 300 MHz) cannot be reflected by _____.
(A) ○ Stratosphere
(B) ○ **Ionosphere (Correct Answer)** (Chosen option)
(C) ○ Troposphere
(D) ○ Exosphere

Question No.17 Marks: 4.00
Bookmark

Lenz Law is in accordance with the law of conservation of _____.
(A) ○ Mass
(B) ○ **Energy (Correct Answer)**
(C) ○ Charge (Chosen option)
(D) ○ Force

Question No.18 Marks: 4.00
Bookmark

The correct expression for capacity (c) of a conductor is given by _____.
(A) ○ V / Q
(B) ○ **Q / V (Correct Answer)** (Chosen option)
(C) ○ Q V
(D) ○ QV^2

Question No.19 Marks: 4.00

Bookmark

The refractive index of the atmosphere for Radio Waves depends on the _____.

(A) ○ **Frequency (Correct Answer)** (Chosen option)

(B) ○ Wavelength

(C) ○ Amplitude

(D) ○ Phase

Question No.20 Marks: 4.00

Bookmark

If the direction of current flowing through the wire is from South to North and the wire is placed over the needle, the North Pole is deflected towards the _____.

(A) ○ East

(B) ○ North

(C) ○ **West (Correct Answer)**

(D) ○ South (Chosen option)

Question No.21 Marks: 4.00

Bookmark

The amount of heat required to raise the temperature of one-gram molecule of a substance through one-degree Celsius is called _____.

(A) ○ **Molar Specific Heat Capacity (Correct Answer)**

(B) ○ Latent Heat Capacity (Chosen option)

(C) ○ Specific Heat Capacity

(D) ○ Thermal Heat Capacity

Question No.22 Marks: 4.00

Bookmark

If the current flows through the electrolyte of the cell from negative to positive terminal, the EMF of the cell is taken as _____.

(A) ○ **Positive (Correct Answer)**

(B) ○ Zero

(C) ○ equal to the Voltage (Chosen option)

(D) ○ Negative

Question No.23 Marks: 4.00

Bookmark

Which of the following is a vector quantity?

(A) ○ Electric Current

(B) ○ **Magnetic Moment (Correct Answer)** (Chosen option)

(C) ○ Elasticity

(D) ○ Magnetic Lines of Force

Question No.24 Marks: 4.00

Bookmark

The relation between Voltage (V) and Current (I) is given by _____.

(A) ○ **Ohm's Law (Correct Answer)** (Chosen option)

(B) ○ Kepler's Law

(C) ○ Newton's Law

(D) ○ Coulomb's Law

Question No.25 Marks: 4.00

Bookmark

Universal Law of Gravitation was proposed by _____.

(A) ○ Galileo

(B) ○ **Newton (Correct Answer)**

(C) ○ Copernicus

(D) ○ Kepler (Chosen option)

Chemistry - Chemistry

Question No.1 Marks: 4.00

Bookmark

How many electrons does helium have in its valence shell?

(A) ○ 8

(B) ○ 6

(C) ○ 4

(D) ○ **2 (Correct Answer)** (Chosen option)

Question No.2 Marks: 4.00

Bookmark

What is the another name for a direct chemical conversion?

(A) ○ **dry corrosion (Correct Answer)** (Chosen option)

(B) ○ wet corrosion

(C) ○ soil corrosion

(D) ○ atmospheric corrosion

Question No.3 Marks: 4.00

Bookmark

The chemistry of organic compounds is called _____.

(A) ○ physical chemistry

(B) ○ general chemistry

(C) ○ inorganic chemistry

(D) ○ **organic chemistry (Correct Answer)** (Chosen option)

Question No.4 Marks: 4.00

Bookmark

A Lewis base _____.

(A) ○ accepts a pair of protons

(B) ○ accepts a pair of electrons

(C) ○ **donates a pair of electrons (Correct Answer)**

(D) ○ donates a pair of protons

Question No.5 Marks: 4.00

Bookmark

Domestic sewage contaminates the _____ water.

(A) ○ rain (Chosen option)

(B) ○ sea

(C) ○ lake

(D) ○ **river (Correct Answer)**

Question No.6 Marks: 4.00

Bookmark

Bauxite is an ore of _____.

(A) ○ zinc

(B) ○ iron

(C) ○ copper
(D) ○ **aluminium (Correct Answer)** (Chosen option)

Question No.7 Marks: 4.00
Bookmark

Metals can be drawn into wires. This property is known as _____.
(A) ○ **ductility (Correct Answer)** (Chosen option)
(B) ○ sonority
(C) ○ malleability
(D) ○ conductivity

Question No.8 Marks: 4.00
Bookmark

Which is the most impure form of all the naturally occurring water?
(A) ○ Rain water
(B) ○ River water
(C) ○ Lake water
(D) ○ **Sea water (Correct Answer)** (Chosen option)

Question No.9 Marks: 4.00
Bookmark

$P_4 + x\ O_2 \rightarrow y\ P_2O_5$. In this chemical reaction, x and y represent _____ and _____.
(A) ○ 2, 4
(B) ○ 3, 2 (Chosen option)
(C) ○ 4, 2
(D) ○ **5, 2 (Correct Answer)**

Question No.10 Marks: 4.00
Bookmark

From which chemical substance was urea synthesized from the laboratory?
(A) ○ Ammonium bromide
(B) ○ Ammonium chloride
(C) ○ Ammonia
(D) ○ **Ammonium cyanate (Correct Answer)**

Question No.11 Marks: 4.00
Bookmark

Pyrolusite is an ore of _____.
(A) ○ **manganese (Correct Answer)**
(B) ○ copper
(C) ○ zinc
(D) ○ iron

Question No.12 Marks: 4.00
Bookmark

$NaNO_3$ carries the name _____.
(A) ○ **Chile salt petre (Correct Answer)**
(B) ○ Gypsum
(C) ○ Magnesite
(D) ○ Monazite

Question No.13 Marks: 4.00

Bookmark

How many neutrons does a helium atom have in its nucleus?

(A) ○ **2 (Correct Answer)** (Chosen option)
(B) ○ 4
(C) ○ 1
(D) ○ 3

Question No.14 Marks: 4.00

Bookmark

Horn silver is _____.

(A) ○ AgOH
(B) ○ **AgCl (Correct Answer)**
(C) ○ Ag_2O
(D) ○ AgBr

Question No.15 Marks: 4.00

Bookmark

Which among the following is an electrolyte?

(A) ○ **Acid (Correct Answer)** (Chosen option)
(B) ○ Copper
(C) ○ Wood
(D) ○ Cane sugar

Question No.16 Marks: 4.00

Bookmark

Which among the following is used in making lead pencils?

(A) ○ Molybdenum disulphide
(B) ○ Blended oils
(C) ○ **Graphite (Correct Answer)** (Chosen option)
(D) ○ Boron nitride

Question No.17 Marks: 4.00

Bookmark

Which method is used to separate easily fusible metals like tin and lead?

(A) ○ **liquation (Correct Answer)**
(B) ○ electrolysis (Chosen option)
(C) ○ reduction
(D) ○ distillation

Question No.18 Marks: 4.00

Bookmark

What is the atomic mass of nitrogen?

(A) ○ **14 (Correct Answer)** (Chosen option)
(B) ○ 7
(C) ○ 21
(D) ○ 16

Question No.19 Marks: 4.00

Bookmark

Which among the following is a synthetic polymer?

(A) ○ Proteins
(B) ○ **Bakelite (Correct Answer)** (Chosen option)

(C) ○ Wool
(D) ○ Silk

Question No.20 Marks: 4.00
Bookmark

Coal and crude oil are _____ and _____ energy.
(A) ○ renewable, non-renewable
(B) ○ **non-renewable, non-renewable (Correct Answer)** (Chosen option)
(C) ○ non-renewable, renewable
(D) ○ renewable, renewable

Question No.21 Marks: 4.00
Bookmark

Acetic acid is represented by the chemical formula _____.
(A) ○ C_2H_5OH
(B) ○ CH_3CH_2COOH (Chosen option)
(C) ○ HCOOH
(D) ○ **CH_3COOH (Correct Answer)**

Question No.22 Marks: 4.00
Bookmark

How many sigma and pi bonds are found in a double bond for carbon in its compounds?
(A) ○ 2 sigma bonds and 0 pi bonds
(B) ○ **1 sigma bond and 1 pi bond (Correct Answer)**
(C) ○ 1.5 sigma bonds and 0.5 pi bonds
(D) ○ 0 sigma bond and 2 pi bonds

Question No.23 Marks: 4.00
Bookmark

What are anode rays?
(A) ○ Positrons
(B) ○ Electrons (Chosen option)
(C) ○ Neutrons
(D) ○ **Protons (Correct Answer)**

Question No.24 Marks: 4.00
Bookmark

What is the name of the organic compound HCHO?
(A) ○ ethanol
(B) ○ acetaldehyde
(C) ○ **formaldehyde (Correct Answer)**
(D) ○ methanol

Question No.25 Marks: 4.00
Bookmark

One example for an organic solvent is _____.
(A) ○ sulphuric acid
(B) ○ **alcohol (Correct Answer)**
(C) ○ water (Chosen option)
(D) ○ hydrochloric acid

Mathematics - Mathematics

Question No.1 Marks: 4.00

Bookmark

The value of $\sin 20^o(3-4\cos^2 70^o)$ is:

(A) ○ **√3/2 (Correct Answer)**

(B) ○ √2

(C) ○ 2/√3

(D) ○ 1/√3

Question No.2 Marks: 4.00

Bookmark

The value of 'x' so that the line passing through (3,4) and (x,5) makes 135^o angle with the positive direction of x-axis is:

(A) ○ **x = 2 (Correct Answer)**

(B) ○ x = 3

(C) ○ x = 0 (Chosen option)

(D) ○ x = 7

Question No.3 Marks: 4.00

Bookmark

Find the equation of plane passing through the point (2,1,3) & normal to the plane having direction ratio (1, 1, 1).

(A) ○ x - y - z + 6 = 0

(B) ○ x - y - z - 6 = 0

(C) ○ x - y + z - 6 = 0

(D) ○ **x + y + z - 6 = 0 (Correct Answer)** (Chosen option)

Question No.4 Marks: 4.00

Bookmark

The length of perpendicular from a point (2,3) to a line 3x-y+4=0 is:

(A) ○ d=7/√110

(B) ○ d=3/√10

(C) ○ d=71/√10

(D) ○ **d=7/√10 (Correct Answer)**

Question No.5 Marks: 4.00

Bookmark

$\lim_{x\to 0} \frac{1}{x^2}$ is:

(A) ○ 0

(B) ○ 2

(C) ○ **∞ (Correct Answer)**

(D) ○ 1 (Chosen option)

Question No.6 Marks: 4.00

Bookmark

If $\vec{a}$ and $\vec{b}$ are parallel vectors, then $[\vec{a}, \vec{b}, \vec{c}]$ is equal to:

(A) ○ 1 (Chosen option)

(B) ○ **0 (Correct Answer)**

(C) ○ 3

(D) ○ 2

Question No.7 Marks: 4.00

Bookmark

$\lim_{x\to 0} \frac{\sqrt{x+4}-2}{x}$ is:

(A) ○ 10
(B) ○ **1/4 (Correct Answer)**
(C) ○ 1/2
(D) ○ 12

Question No.8 Marks: 4.00

Bookmark

The area of the parallelogram whose adjacent sides are $\vec{a} = 3\vec{i} + \vec{j} + 4\vec{k}$ and $\vec{b} = \vec{i} - \vec{j} + \vec{k}$ is:

(A) ○ 10 Sq. units
(B) ○ **√42 Sq. units (Correct Answer)** (Chosen option)
(C) ○ 42 sq. units
(D) ○ 34 Sq. units

Question No.9 Marks: 4.00

Bookmark

If $x^2 + y^2 = 4$ then $\frac{d^2y}{dx^2}$ is:

(A) ○ 0
(B) ○ $1/y^3$
(C) ○ $2/y^3$
(D) ○ **$-4/y^3$ (Correct Answer)**

Question No.10 Marks: 4.00

Bookmark

The radian of 18^o is:
(A) ○ π/2 radian
(B) ○ **π/10 radian (Correct Answer)** (Chosen option)
(C) ○ 2π/3 radian
(D) ○ 2π/5 radian

Question No.11 Marks: 4.00

Bookmark

The value of $Sin480^o$ is:
(A) ○ 0
(B) ○ √3
(C) ○ 1
(D) ○ **√3/2 (Correct Answer)** (Chosen option)

Question No.12 Marks:

4.00

Bookmark

If $\overrightarrow{2i} - \vec{j} + 3\overrightarrow{k},\ \overrightarrow{3i} + \overrightarrow{2j} + \vec{k},\ \vec{i} + m\vec{j} + 4\vec{k}$ are coplanar, then the value of m is:

(A) ○ -2
(B) ○ **-3 (Correct Answer)** (Chosen option)
(C) ○ 3
(D) ○ 1

Question No.13

Marks: 4.00

Bookmark

The Value of $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{DA} + \overrightarrow{CD}$ is:

(A) ○ $\overrightarrow{-AD}$
(B) ○ $\vec{0}$ **(Correct Answer)**
(C) ○ $\overrightarrow{AD}$
(D) ○ $\overrightarrow{CA}$ (Chosen option)

Question No.14

Marks: 4.00

Bookmark

The value of $\sin^{-1}x + \cos^{-1}x$ is:
(A) ○ 1
(B) ○ π/3
(C) ○ **π/2 (Correct Answer)**
(D) ○ 0 (Chosen option)

Question No.15

Marks: 4.00

Bookmark

$\int Sin^{-1}x\ dx$ is:

(A) ○ $xsin^{-1}x + \sqrt{1-x^2} + C$ **(Correct Answer)**
(B) ○ $xsin^{-1}x - \sqrt{1-x^2} + C$
(C) ○ $xcos^{-1}x + \sqrt{1-x^2} + C$
(D) ○ $xcos^{-1}x - \sqrt{1-x^2} + C$ (Chosen option)

Question No.16

Marks: 4.00

Bookmark

If $f'(x) = 3x^2 - 4x + 5$ and $f(1) = 3$, then find $f(x)$.

(A) ○ x^3-2x^2+5x-1 **(Correct Answer)** (Chosen option)
(B) ○ x^3-2x^2+5x-3
(C) ○ x^3-2x^2+x-1
(D) ○ x^3-x^2+5x-1

Question No.17 Marks: 4.00
Bookmark

The principal value of $sin^{-1}(\frac{-1}{2})$ is:

(A) ○ π/2
(B) ○ π/4
(C) ○ 2π
(D) ○ **-π/6 (Correct Answer)** (Chosen option)

Question No.18 Marks: 4.00
Bookmark

If distance between the points P(0,2,0) and Q(a,0,4) is 6, then the value of a is:
(A) ○ ±1
(B) ○ **±4 (Correct Answer)** (Chosen option)
(C) ○ ±8
(D) ○ ±3

Question No.19 Marks: 4.00
Bookmark

The co-ordinates of centroid of the triangle whose vertices are (0,6), (8,12) and (8,0) is:
(A) ○ (1,2)
(B) ○ **((16/3), 6) (Correct Answer)** (Chosen option)
(C) ○ (4,4)
(D) ○ (3, (1/2))

Question No.20 Marks: 4.00
Bookmark

The direction cosines of a line whose direction ratios are 1,2,3 is:
(A) ○ $\langle\frac{-1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}\rangle$
(B) ○ $\langle\frac{1}{\sqrt{14}}, \frac{-2}{\sqrt{14}}, \frac{3}{\sqrt{14}}\rangle$
(C) ○ $\langle\frac{-1}{\pm\sqrt{14}}, \frac{-2}{\pm\sqrt{14}}, \frac{-3}{\pm\sqrt{14}}\rangle$
(D) ○ $\langle\frac{1}{\pm\sqrt{14}}, \frac{2}{\pm\sqrt{14}}, \frac{3}{\pm\sqrt{14}}\rangle$ **(Correct Answer)** (Chosen option)

Question No.21 Marks: 4.00

Bookmark

If $\vec{a}$ *and* $\vec{b}$ having same magnitude and angle between them is 60° and their scalar product is $\frac{1}{2}$ then $|\vec{a}|$ *is*:

(A) ○ 3
(B) ○ 7
(C) ○ 2
(D) ○ **1 (Correct Answer)**

Question No.22 Marks: 4.00

Bookmark

Find the midpoint of the line joining P(2,3) and Q(4,5).

(A) ○ (-3,- 4)
(B) ○ (3, -4)
(C) ○ **(3, 4) (Correct Answer)** (Chosen option)
(D) ○ (-3, 4)

Question No.23 Marks: 4.00

Bookmark

If $siny = ycos2x$ then $\frac{dy}{dx}$ is:

(A) ○ $\frac{-1}{cosy-cos2x}$

(B) ○ $\frac{-2sin2x}{cosy-cos2x}$

(C) ○ $\frac{sin2x}{cosy-cos2x}$

(D) ○ $\frac{-2ysin2x}{cosy-cos2x}$ **(Correct Answer)** (Chosen option)

Question No.24 Marks: 4.00

Bookmark

The equation of a circle be $25x^2+25y^2-30x-10y-6=0$ then the center and radius is:

(A) ○ $center: \left(\frac{3}{5}, \frac{12}{5}\right) \& r = \frac{4}{5}$

(B) ○ $center: \left(\frac{3}{5}, \frac{1}{5}\right) \& r = \frac{4}{5}$ **(Correct Answer)** (Chosen option)

(C) ○ $center: \left(\frac{3}{5}, \frac{1}{5}\right) \& r = \frac{4}{3}$

(D) ○ $center: \left(\frac{3}{5}, 2\right) \& r = \frac{4}{5}$

Question No.25

Marks: 4.00

Bookmark

For what value of the constant C is the function continuous on $(-\infty, \infty)$?

$$f(x) = \begin{cases} Cx^2 + 2x, if \ \ x < 2 \\ x^3 - Cx, if \ \ x \geq 2 \end{cases}$$

(A) ○ 1/10
(B) ○ **2/3 (Correct Answer)**
(C) ○ 1/3
(D) ○ 1/2

Engineering Mechanics - Engineering Mechanics

Question No.1

Marks: 4.00

Bookmark

When the point of application of force acting on a body is shifted to any other point on the line of action of the force without changing its directions, the equilibrium state of the body remains unaltered. This is called as____

(A) ○ resolution of a force
(B) ○ resultant of forces
(C) ○ **transmissibility of a force (Correct Answer)** (Chosen option)
(D) ○ equilibrant

Question No.2

Marks: 4.00

Bookmark

A second system of pulleys has 3 pulleys in the upper block and 2 pulleys in the lower block. The efficiency of the system is 60%. The effort required to lift a load of 300 N is ___.

(A) ○ 200 N
(B) ○ 75 N
(C) ○ 133 N
(D) ○ **100 N (Correct Answer)**

Question No.3

Marks: 4.00

Bookmark

The centre of gravity of an unequal angle section of 10 cm x 16 cm x 2 cm is ___.

(A) ○ **(5.67 cm, 2.67 cm) (Correct Answer)**
(B) ○ (4.51 cm, 3.67 cm)
(C) ○ (6.25 cm, 6.5 cm)
(D) ○ (3.67 cm, 4.67 cm)

Question No.4

Marks: 4.00

Bookmark

A uniform ladder of length 10m and weight 200 N is kept against a SMOOTH vertical wall with its lower end 6m away from the wall. If the ladder is about to slip, the coefficient of friction between the ladder and the floor is _____.

(A) ○ 0.25
(B) ○ **0.375 (Correct Answer)**
(C) ○ 0.5
(D) ○ 0.125

Question No.5 Marks: 4.00

Bookmark

The ratio of force of friction to the normal reaction is called as ____.

(A) ○ **coefficient of friction (Correct Answer)** (Chosen option)

(B) ○ angle of repose

(C) ○ angle of friction

(D) ○ frictional resistance

Question No.6 Marks: 4.00

Bookmark

A hollow rectangular section is defined by its external dimensions: breadth 6 cm, depth 8 cm and internal dimensions: breadth 3 cm, depth 4 cm. The moment of inertia of the section about its centre of gravity is ____.

(A) ○ 480 cm^4, 270 cm^4

(B) ○ 340 cm^4, 235 cm^4

(C) ○ **240 cm^4, 135 cm^4 (Correct Answer)** (Chosen option)

(D) ○ 200 cm^4, 125 cm^4

Question No.7 Marks: 4.00

Bookmark

The number of cycles of oscillations in one second is called ____.

(A) ○ amplitude

(B) ○ **frequency (Correct Answer)** (Chosen option)

(C) ○ simulitude

(D) ○ time period

Question No.8 Marks: 4.00

Bookmark

When a force acts on a body, it moves through certain distance. The amount of work done is equal to the _____ of force and the displacement in the ____ of the force.

(A) ○ quotient, direction

(B) ○ sum, direction

(C) ○ product, perpendicular direction

(D) ○ **product, direction (Correct Answer)** (Chosen option)

Question No.9 Marks: 4.00

Bookmark

A rectangular section is defined by its width b and depth d. The moment of inertia of the section with respect to XX' axis is _____.

(A) ○ **$bd^3/12$ (Correct Answer)** (Chosen option)

(B) ○ $db^3/12$

(C) ○ $db^2/12$

(D) ○ $bd^2/12$

Question No.10 Marks: 4.00

Bookmark

A body of weight W is lying on a horizontal plane. The coefficient of friction is μ, the magnitude of the force that will move the body, when applied at angle θ to the horizontal is ____.

(A) ○ P = W / (cos θ + μ sin θ)

(B) ○ **P = μW / (cos θ + μ sin θ) (Correct Answer)**

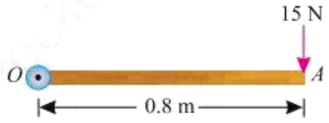
(C) ○ P =W / (μ cos θ + sin θ) (Chosen option)

(D) ○ P = μW / (μ cos θ + sin θ)

Question No.11 Marks: 4.00

Bookmark

A force of 15 N is applied perpendicular to the edge of a door 0.8 m wide as shown in the figure. The moment of the force about the hinge is _____.



(A) ○ **12 Nm (clockwise) (Correct Answer)** (Chosen option)
(B) ○ 15 Nm (anti-clockwise)
(C) ○ 24 Nm (anti-clockwise)
(D) ○ 18 Nm (clockwise)

Question No.12 Marks: 4.00

Bookmark

As per the perpendicular axis theorem, the moment of inertia of a plane lamina about an axis perpendicular to the plane lamina is ____.

(A) ○ **$I_{XX} + I_{YY}$ (Correct Answer)** (Chosen option)
(B) ○ $I_{XX} - I_{YY}$
(C) ○ $I_{XX} \times I_{YY}$
(D) ○ I_{XX} / I_{YY}

Question No.13 Marks: 4.00

Bookmark

A body of 500 N is placed on a horizontal surface. A horizontal pull of P is applied on the body. The coefficient of friction between the body and the surface is 0.25. The horizontal pull required to move the body is _____.

(A) ○ 175 N
(B) ○ **125 N (Correct Answer)** (Chosen option)
(C) ○ 150 N
(D) ○ 200 N

Question No.14 Marks: 4.00

Bookmark

Which law of motion is termed as the law of inertia?

(A) ○ Newton's III law of motion
(B) ○ D'Alembert Principle
(C) ○ Newton's II law of motion (Chosen option)
(D) ○ **Newton's I law of motion (Correct Answer)**

Question No.15 Marks: 4.00

Bookmark

If μ is the coefficient of friction and φ is the angle of friction, then μ is equal to:

(A) ○ cot φ
(B) ○ cos φ (Chosen option)
(C) ○ sin φ
(D) ○ **tan φ (Correct Answer)**

Question No.16 Marks: 4.00

Bookmark

A spring having a stiffness 20 N/mm (force required to produce unit deflection) is stretched by 50 mm by the application of the external load. The work done on the spring is _____.

(A) ○ **25 J (Correct Answer)**

(B) ○ 80 J
(C) ○ 40 J
(D) ○ 60 J

Question No.17 Marks: 4.00

Bookmark

The centroid of a triangle of height (h) lies at a height of ____ from the base.

(A) ○ h/2
(B) ○ **h/3 (Correct Answer)**
(C) ○ 2h/3 (Chosen option)
(D) ○ 3h/4

Question No.18 Marks: 4.00

Bookmark

The forces whose lines of action lie on the same plane, and at the same time pass through common point is called ___.

(A) ○ non-coplanar, concurrent forces
(B) ○ non-coplanar, non-concurrent forces
(C) ○ coplanar, non-concurrent forces
(D) ○ **coplanar, concurrent forces (Correct Answer)** (Chosen option)

Question No.19 Marks: 4.00

Bookmark

In a simple wheel and axle arrangement, a load of 40 N is lifted through an effort of 10 N. The efficiency of the arrangement is 80%. The diameter of the wheel is 40 cm. The diameter of the axle is ____.

(A) ○ **8 cm (Correct Answer)**
(B) ○ 9 cm
(C) ○ 10 cm (Chosen option)
(D) ○ 9.5 cm

Question No.20 Marks: 4.00

Bookmark

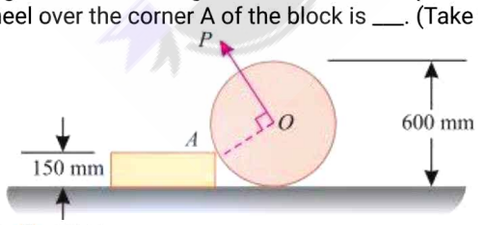
Which one of the following is a vector quantity?

(A) ○ Length
(B) ○ Mass
(C) ○ Volume
(D) ○ **Momentum (Correct Answer)** (Chosen option)

Question No.21 Marks: 4.00

Bookmark

A uniform wheel of 600 mm diameter, weighing 10 kN rests against a rigid rectangular block of 150 mm height as shown in Figure below. The least pull, through the centre of the wheel, required just to turn the wheel over the corner A of the block is ___. (Take all the surfaces to be smooth)



(A) ○ 5 kN
(B) ○ **8.66 kN (Correct Answer)** (Chosen option)
(C) ○ 13 kN
(D) ○ 12 kN

Question No.22 Marks: 4.00

Bookmark

In a simple lifting machine, the ratio of the weight lifted to the effort applied is called as _____.

(A) ○ **mechanical advantage (Correct Answer)** (Chosen option)

(B) ○ input

(C) ○ velocity ratio

(D) ○ output

Question No.23 Marks: 4.00

Bookmark

In a lifting machine, an effort of 50 N is applied to lift a load of 500 N. The effort moves through 60 cm and the load moves through 5 cm. The efficiency of the machine is _____.

(A) ○ 75%

(B) ○ 69%

(C) ○ **83% (Correct Answer)** (Chosen option)

(D) ○ 92%

Question No.24 Marks: 4.00

Bookmark

A spring fixed at its upper end carries a mass of 10 kg attached to it at its lower end. The mass vibrates with $1/\pi$ oscillations per second. The stiffness of the spring is ____.

(A) ○ **40 N/m (Correct Answer)**

(B) ○ 20 N/m

(C) ○ 80 N/m

(D) ○ 120 N/m

Question No.25 Marks: 4.00

Bookmark

Two forces 8 kN and 6 kN are acting simultaneously at a point. What is the resultant of these two forces if the angle between them is 60^{o} ? (In Integers)

(A) ○ 14 kN

(B) ○ **12 kN (Correct Answer)** (Chosen option)

(C) ○ 9 kN

(D) ○ 10 kN

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