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# **Agniveer Vayu Group X**

**Memory Based Paper**  
**13 Oct 2023 Shift 1**



## 34 Questions

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**Que. 1** Kepler's second law regarding the areal velocity of a planet is an application of the law of conservation of

1. Angular momentum
2. Energy
3. Linear momentum
4. None of these

Correct Option - 1

**Que. 2** The ratio of the dimension of Planck's constant and that of the moment of inertia is the dimension of

1. Frequency
2. Velocity
3. Acceleration
4. Time

Correct Option - 1

**Que. 3** A body executing simple harmonic motion has an amplitude of 0.01 m and a frequency of 50 Hertz. The ratio of the magnitude of maximum acceleration and maximum velocity of the body is

1.  $25 \pi$
2.  $50 \pi$
3.  $100 \pi$
4.  $200 \pi$

Correct Option - 3

**Que. 4** A conductor carries a current of 20A and is at right-angles to a magnetic field having a flux density of 0.9T. If the length of the conductor in the field is 30 cm, calculate the force acting on the conductor.

1. 2.6 N
2. 5.4 N
3. 54 N
4. 27 N

Correct Option - 2

**Que. 5** The induced emf in a coil is given as:

1.  $e = L \frac{d\varphi}{dt}$
2.  $e = L \frac{di}{dt}$

3.  $e = -L \frac{di}{dt}$
4.  $e = L \frac{d^2i}{dt^2}$

Correct Option - 3

**Que. 6** The efficiency of Carnot heat engine is 75% and the amount of heat absorbed is 300 Joule, then the work done is?

1. 225 J
2. 300 J
3. 220 J
4. None of these

Correct Option - 1

**Que. 7** A ball, initially at rest, is dropped from a height  $h$  above the floor bounces again and again vertically. If the coefficient of restitution between the ball and the floor is 0.5, the total distance travelled by the ball before it comes to rest is

1.  $8h/3$
2.  $5h/3$
3.  $3h$
4.  $2h$

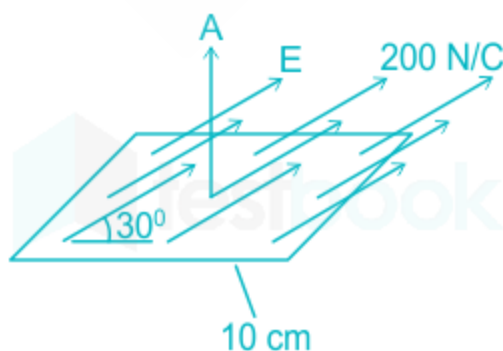
Correct Option - 2

**Que. 8** The ratio of the amplitude of the magnetic field to the amplitude of the electric field for electromagnetic wave propagation in a vacuum is equal to

1. Unity
2. Speed of light in vacuum
3. Reciprocal of the speed of light in vacuum
4. The ratio of magnetic permeability to electrical susceptibility in a vacuum.

Correct Option - 3

**Que. 9** The magnitude of electric flux through the given square surface is:



1.  $20 \text{ N m}^2 \text{ C}^{-1}$
2.  $200 \text{ N m}^2 \text{ C}^{-1}$
3.  $0.1 \text{ N m}^2 \text{ C}^{-1}$
4.  $1 \text{ N m}^2 \text{ C}^{-1}$

Correct Option - 4

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**Que. 10** For the destructive interference of the two similar waves, the phase difference between the waves must be:

1. 0
2.  $\frac{\pi}{2}$
3.  $\pi$
4. None of these

Correct Option - 3

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**Que. 11** The torque experienced by a magnetic dipole, having dipole moment  $M$ , when placed in a uniform magnetic field of intensity  $B$  is:

1.  $MB$
2.  $M \cdot B$
3.  $\frac{|M|}{|B|}$
4.  $M \times B$

Correct Option - 4

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**Que. 12** Consider a force acts on a 1 kg block so that its position is given as a function of time as  $x = 3t^2 + 5$ . What will be the work done by this force in first 5 seconds?

1. 900 J
2. 500 J
3. 800 J
4. 450 J

Correct Option - 4

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**Que. 13** If the equation of parabola is  $y^2 = -12x$ , then which of the following is true ?

1. Equation of axis is:  $y = 0$
2. Equation of directrix is:  $x - 3 = 0$
3. Equation of latus rectum is:  $x + 3 = 0$
4. All of the above

Correct Option - 4

**Que. 14** The equation of circle passing through (4, 5) and having the centre at (2, 2), is

1.  $x^2 + y^2 + 4x + 4y - 5 = 0$
2.  $x^2 + y^2 - 4x - 4y - 5 = 0$
3.  $x^2 + y^2 - 4x = 13$
4.  $x^2 + y^2 - 4x - 4y + 5 = 0$

Correct Option - 2

**Que. 15** If the sum of the matrices  $\begin{bmatrix} x \\ x \\ y \end{bmatrix}$ ,  $\begin{bmatrix} y \\ y \\ z \end{bmatrix}$  and  $\begin{bmatrix} z \\ 0 \\ 0 \end{bmatrix}$  is the matrix  $\begin{bmatrix} 10 \\ 5 \\ 5 \end{bmatrix}$  then what is the value of y ?

1. -5
2. 0
3. 5
4. 10

Correct Option - 2

**Que. 16** The general solution of  $\cot \theta + \tan \theta = 2$  is

1.  $\theta = n\pi + (-1)^n \frac{\pi}{8}$
2.  $\theta = \frac{n\pi}{2} + (-1)^n \frac{\pi}{6}$
3.  $\frac{n\pi}{2} + (-1)^n \frac{\pi}{4}$
4.  $\theta = \frac{n\pi}{2} + (-1)^n \frac{\pi}{8}$

Correct Option - 3

**Que. 17** If  $i^2 = -1$  then the value of  $\sum_{n=1}^{200} i^n$  is

1. 50
2. -50
3. 0
4. 100

Correct Option - 3

**Que. 18** What is  $\int \left( \frac{1}{\cos^2 x} - \frac{1}{\sin^2 x} \right) dx$  equal to ?

Where c is the constant of integration

1.  $2 \operatorname{cosec} 2x + c$
2.  $-2 \cot 2x + c$



3.  $2 \sec 2x + c$
4.  $-2 \tan 2x + c$

Correct Option - 1

**Que. 19** If  $x = A \cos 4t + B \sin 4t$ , then  $\frac{d^2x}{dt^2}$  is equal to -

1.  $-16x$
2.  $16x$
3.  $x$
4.  $-x$

Correct Option - 1

**Que. 20**  $\int_0^1 \frac{1}{\sqrt{4-x^2}} dx =$

1.  $\frac{\pi}{6}$
2.  $\frac{\pi}{4}$
3.  $\frac{\pi}{3}$
4.  $\frac{\pi}{2}$

Correct Option - 1

**Que. 21** What is  $\lim_{x \rightarrow 0} \frac{x}{\sqrt{1 - \cos 4x}}$  equal to ?

1.  $\frac{1}{2\sqrt{2}}$
2.  $-\frac{1}{2\sqrt{2}}$
3.  $\sqrt{2}$
4. Limit does not exist

Correct Option - 4

**Que. 22** Find the value of  $\vec{a} \times \vec{a}$

1. 1
2. 0
3.  $|\vec{a}|$
4.  $|\vec{a}|^2$

Correct Option - 2

**Que. 23** If  ${}^nC_{10} = {}^nC_{15}$ , then  ${}^{27}C_n$  equals

1. 702
2. 351
3. 729
4. 243

Correct Option - 2

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**Que. 24** If  $y = \frac{(\sin x - \cos x)}{\sin 2x}$ , find  $\frac{dy}{dx}$

1.  $\frac{1}{2}(\sec x \cdot \cot x + \operatorname{cosec} x \cdot \tan x)$
2.  $\frac{1}{2}(\sec x \cdot \cot x - \operatorname{cosec} x \cdot \tan x)$
3.  $\frac{1}{2}(\sec x \cdot \tan x + \operatorname{cosec} x \cdot \cot x)$
4.  $\frac{1}{2}(\sec x \cdot \tan x - \operatorname{cosec} x \cdot \cot x)$

Correct Option - 3

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**Que. 25** Select the most appropriate synonym for the given word.

Merciful

1. Brutal
2. Stubborn
3. Kind
4. Grateful

Correct Option - 3

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**Que. 26** In the following question, out of the four alternatives, select the word opposite in meaning to the word given.

Lethargic

1. Torpid
2. Dull
3. Energetic
4. Narcotic

Correct Option - 3

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**Que. 27** Choose the word that can substitute the given group of words.

One who looks at the dark side of life

1. Libertine
2. Pessimist
3. Anarchist
4. Extrovert



Correct Option - 2

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**Que. 28** Select the wrongly spelt word.

1. Celebrate
2. Celebrant
3. Celebrity
4. Celeboration

Correct Option - 4

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**Que. 29** What is the noun form of 'Restrict'?

1. Restricted
2. Restricting
3. Restriction
4. Restrictive

Correct Option - 3

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**Que. 30** In the given sentence, identify the segment that contains a grammatical error.

There is a few water in the bowl on the table.

1. There is
2. in the bowl
3. on the table
4. a few water

Correct Option - 4

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**Que. 31** Select the option that expresses the given sentence in indirect speech.

She said, "I wrote a book."

1. She said that he has written a book.
2. She said that he had been written a book.
3. She said that she had written a book.
4. She said that she has written a book.

Correct Option - 3

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**Que. 32** Select the option that expresses the given sentence in passive voice.

I am eating mangoes.

1. Mangoes is being eaten by me.
2. Mangoes are being eaten by me.
3. Mangoes have been eaten by me.

4. Mangoes are eaten by me.

Correct Option - 2

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**Que. 33** In the following sentences, choose the correct verb which agrees with the subject.

Many a soldier \_\_\_\_\_ killed in the war.

1. have
2. was
3. did
4. are

Correct Option - 2

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**Que. 34** The idiom 'A snake in the grass' means:

1. a hidden enemy
2. a recognizable danger
3. not a reliable person
4. unexpected happening

Correct Option - 1

