

---

2021-12-25

1. A particle is acted upon by a force of constant magnitude which is always perpendicular to the velocity of the particle, the motion of the particle takes place in a plane. It follows that

Its velocity is constant

Its acceleration is constant

Its kinetic energy is constant

It moves in a straight line

2. A body of mass 1 kg tied to one end of string is revolved in a horizontal circle of radius 0.1 m with a speed of 3 revolution/sec, assuming the effect of gravity is negligible, then linear velocity, acceleration and tension in the string will be

1.  $88\text{m/s}$ ,  $35.5\text{m/s}^2$ ,  $35.5\text{N}$

2.  $88\text{m/s}$ ,  $45.5\text{m/s}^2$ ,  $45.5\text{N}$

3.  $88\text{m/s}$ ,  $55.5\text{m/s}^2$ ,  $55.5\text{N}$

None of these

3. An electron is moving with a speed of  $10^8\text{ m/sec}$  perpendicular to a uniform magnetic field of intensity  $B$ . Suddenly intensity of the magnetic field is reduced to  $B/2$ , the radius of the path becomes from the original value of  $r$

No change

Reduces to  $r/2$

Increases to  $2r$

Stops moving

4. A billiard ball moving with a speed of  $5\text{ m/s}$  collides with an identical ball originally at rest. If the first ball stops after collision, then the second ball will move forward with a speed of

$10\text{ms}^{-1}$

$5\text{ms}^{-1}$

$2.5\text{ms}^{-1}$

$1.0\text{ms}^{-1}$

5. The orbital angular momentum of a satellite revolving at a distance  $r$  from the centre is  $L$ . If the distance is increased to  $16r$ , then the new angular momentum will be

$16L$

---

64 L

$$\frac{L}{4}$$

4 L

6. A spring 40 mm long is stretched by the application of a force. If 10 N force required to stretch the spring through 1 mm, then work done in stretching the spring through 40 mm is

84 J

68 J

23 J

8 J

7. A narrow electron beam passes undeviated through an electric field  $E = 3 \times 10^4$  volt/m and an overlapping magnetic field  $B = 2 \times 10^{-3}$  Weber/m<sup>2</sup>. If electric field and magnetic field are mutually perpendicular. The speed of the electrons is

60 m/s

$$10.3 \times 10^7 \text{ m/s}$$

$$1.5 \times 10^7 \text{ m/s}$$

$$0.67 \times 10^{-7} \text{ m/s}$$

8. A charged oil drop is suspended in a uniform field of  $3 \times 10^4$  V/m so that it neither falls nor rises. The charge on the drop will be (take the mass of the charge =  $9.9 \times 10^{-15}$  kg and  $g = 10 \text{ m/s}^2$ )

$$3.3 \times 10^{-18} \text{ C}$$

$$3.2 \times 10^{-18} \text{ C}$$

$$1.6 \times 10^{-18} \text{ C}$$

$$4.8 \times 10^{-18} \text{ C}$$

9. An air-filled parallel plate capacitor has capacity C. If distance between plates is doubled and it is immersed in a liquid then capacity becomes twice. Dielectric constant of the liquid is

1

2

3

4

10. A circular disc of mass 2 kg and radius 10 cm rolls without slipping with a speed 2 m/s. The total kinetic energy of disc is

---

10 J

6 J

2 J

4 J

11. An automobile travelling with a speed of 60 km/hr, can brake to stop within a distance of 20 m. If the car is going twice as fast i.e., 120 km/h, the stopping distance will be

60 m

40 m

80 m

20 m

12. The potential difference between points A and B of adjoining figure is

$\frac{2}{3}V$

$\frac{8}{9}V$

$\frac{4}{3}V$

$2V$

13. The orthocenter of a right angled triangle is:

midpoint of hypotenuse

somewhere inside the triangle

the vertex of right angle

not well defined

14.  $\tan^{-1} \frac{1}{2} + \tan^{-1} \frac{1}{3} =$

0

$\pi/4$

$\pi/2$

$\pi$

15.  $\sqrt{-2} \times \sqrt{-3} =$

$\sqrt{6}$

---

$-\sqrt{6}$

$i\sqrt{6}$

none of these

16.If  $a, b, c$  are in G.P., then

$a^2, b^2, c^2$  are in G.P.

$a^2(b+c), c^2(a+b), b^2(a+c)$  are in G.P.

$\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$  are in G.P.

None of the above

17.The area under curve  $y = f(x)$  and above  $y = g(x)$  bounded by ordinates  $x = a$  and  $x = b$  is:

$\int_a^b [f(x) + g(x)]dx$

$\int_a^b [f(x) - g(x)]dx$

$\int_a^b [g(x) - f(x)]dx$

$\int_a^b [f(x) \times g(x)]dx$

18.If  $\int_7^{10} f(x)dx = 3, \int_2^{10} f(x)dx = 10$  and  $\int_2^5 f(x)dx = 4$  then  $\int_5^7 f(x)dx =$

0

3

11

8

19.  $\int e^x(\sin x - \cos x)dx =$

$e^x \sin x$

$e^x \cos x$

$-e^x \cos x$

$-e^x \sin x$

20.If the angle between two vectors  $i + k$  and  $i - j + ak$  is  $\pi/3$ , then the value of  $a =$

2

---

4

• 2

0

21.If the line  $y = \sqrt{3}x + k$  touches the circle  $x^2 + y^2 = 16$ , then  $k =$

0

2

4

8

22.The function  $f(x) = \ln |x + \sqrt{x^2 + 1}|$  is:

even function

symmetric about x-axis

odd function

none of these

23. $y = \tan^{-1} \sqrt{\frac{a-x}{a+x}}$ , then  $\frac{dy}{dx} =$

$\cos^{-1} \frac{x}{a}$

$-\cos^{-1} \frac{x}{a}$

$\frac{1}{2} \cos^{-1} \frac{x}{a}$

None of these

24.The number of real roots of the equation  $(\ln x)^2 - \ln(x^2) - 3 = 0$  is:

1

2

3

4

25.The focus of the parabola  $y^2 = 4y - 4x$  is:

(0, 2)

(1, 2)

---

(2, 0)

(2, 1)

26. A ladder 10 m long rests against a vertical wall with the lower end on the horizontal ground. The lower end of the ladder is pulled along the ground away from the wall at the rate of 3 cm/sec. The height of the upper end while it is descending at the rate of 4 cm/sec is

$4\sqrt{3}m$

$5\sqrt{3}m$

$8m$

$6m$

27. General solution of the equation  $\cot \theta - \tan \theta = 2$  is

$n\pi + \frac{\pi}{4}$

$\frac{n\pi}{2} + \frac{\pi}{8}$

$\frac{n\pi}{2} \pm \frac{\pi}{8}$

None of these

28.  $\int \frac{1 - \tan x}{1 + \tan x} dx =$

$\log \sec \left( \frac{\pi}{4} - x \right) + c$

$\log \cos \left( \frac{\pi}{4} + x \right) + c$

$\log \sin \left( \frac{\pi}{4} + x \right) + c$

None of these

29. Major product of the following reaction is  $CH_3 - CH(Br) - CH_2 - CH_3 + \text{alc. } KOH \rightarrow$

Butene-1

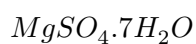
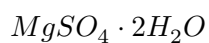
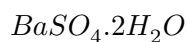
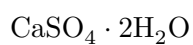
Butene-2

Butane

Butyne-1

---

30. Epsom salt is



31. Iodoethane is converted to Butane by reacting it with ..... metal in presence of ether.

Na

Al

Mg

Zn

32. When  $\text{Cl}_2$  gas is passed through hot and conc. solution of  $\text{KOH}$ , following compound is formed



33. 0.1914 g of an organic acid is dissolved in approx. 20 ml of water. 25 ml of 0.12 N  $\text{NaOH}$  required for the complete neutralization of the acid solution. The equivalent weight of the acid is

65

64

63.80

62.50

34. The correct IUPAC name of  $\text{H}_2\text{C} = \text{CH} - \text{CH}(\text{CH}_3) - \text{CH}_2\text{C} \equiv \text{CH}$  is

3-methyl-1-hexen-5-yne

4-methyl-5-hexen-1-yne

4-(ethenyl)-1-pentyne

3-(2-propenyl) butene-1

35. For the reaction  $\text{PCl}_3(g) + \text{Cl}_2(g) = \text{PCl}_5(g)$  at  $250^\circ\text{C}$  the value of  $K_c$  is 26, then the value of  $K_p$  on the same temperature will be :

---

0.61

0.57

0.83

0.46

36.The number of H-atoms present in 1ml of water is (Density of H<sub>2</sub>O = 1)

$5.37 \times 10^{19}$

$3.34 \times 10^{22}$

$6.69 \times 10^{22}$

$6.023 \times 10^{23}$

37.My mother taught me

how to swim?

how to swimming?

how to swim.

how to swimming.

38.This singer, along with a few others, ... the harmonica on stage.

play

plays

both

none

39.Shankaran Pillai was born \_\_\_\_ a Saturday.

in

at

on

All of above

40.I know you are not happy.

noun

verb

adjective

conjunction