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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

$1.88\mathrm{m/s}, 35.5\mathrm{m/s^2}, 35.5\mathrm{N}$

$2.88m/s, 45.5\mathrm{m/s^2}, 45.5\mathrm{N}$

$3.88\mathrm{m/s}, 55.5\mathrm{m/s^2}, 55.5\mathrm{N}$

None of these

3.An electron is moving with a speed of $10^8\ m/\sec$ 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 2*r*

Stops moving

4.A billiard ball moving with a speed of 5 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

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

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

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

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

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

16 *L*

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

84J

68J

23J

8J

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 $/\mathrm{m}^2$. If electric field and magnetic field are mutually perpendicular. The speed of the electrons is

$60\ \mathrm{m/s}$

$10.3 \times 10^7 m/s$

$1.5 \times 10^7 m/s$

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

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

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

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

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

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

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 $\mathrm{km/hr}$, can brake to stop within a distance of 20 m . If the car is going twice as fast i.e., 120 $\mathrm{km/h}$, 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

$\pi/4$

$\pi/2$

π

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 funtion $f(x) = \ln|x + \sqrt{x^2 + 1}|$ 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 $CH_3 - CH(Br) - CH_2 - CH_3 +$ alc. $KOH \rightarrow$

Butene-1

Butene-2

Butane

Butyne-1

30.Epsom salt is

$\mathrm{CaSO_4 \cdot 2H_2O}$

$BaSO_4.2H_2O$

$MgSO_4 \cdot 2H_2O$

$MgSO_4.7H_2O$

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

Na

Al

Mg

Zn

32.When Cl_2 gas is passed through hot and conc. solution of KOH, following compound is formed

$KClO$

$\mathrm{KClO_2}$

$\mathrm{KClO_3}$

$\mathrm{KClO_4}$

33.0.1914 *g* of an organic acid is dissolved in approx. 20 *ml* of water. 25 *ml* of 0.12 *N 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 $H_2C = CH - CH(CH_3) - CH_2C \equiv CH$ 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 $PCl_3(g) + Cl_2(g) = PCl_5(g)$ at $250^{\circ}C$ .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_2O = 1)

5.37 x 10^{19}

3.34 x 10^{22}

6.69 x 10^{22}

6.023 x 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