2021-12-29

1.Voltage and current in an ac circuit are given by $V = 5\sin\left(100\pi t - \frac{\pi}{6}\right)$ and $I = 4\sin\left(100\pi t + \frac{\pi}{6}\right)$

Voltage leads the current by 30°

Current leads the voltage by 30°

Voltage leads the current by 60°

Current leads the voltage by 60°

2.A car is going round a circle of radius R_1 with constant speed. Another car is going round a circle of radius R_2 with constant speed. If both of them take same time to complete the circles, the ratio of their angular speeds

$\sqrt{\frac{R_1}{R_2}}$

$\frac{R_1}{R_2}$

$\frac{R_1^2}{R_2^2}$

1

3.Two trains, each 50 m long are travelling in opposite direction with velocity 10 m/s and 15 m/s. The time of crossing is

$2s$

$4s$

$2\sqrt{3}s$

$4\sqrt{3}s$

4.At some temperature T, a bronze pin is a little large to fit into a hole drilled in a steel block. The change in temperature required for an exact fit is minimum when

Only the block is heated

Both block and pin are heated together

Both block and pin are cooled together

Only the pin is cooled

5.On a glass plate a light wave is incident at an angle of 60°. If the reflected and the refracted waves are mutually perpendicular, the refractive index of material is

$\frac{\sqrt{3}}{2}$

$\sqrt{3}$

$\frac{3}{2}$

$\frac{1}{\sqrt{3}}$

6.The periodic time of a body executing simple harmonic motion is 3 *sec* . After how much interval from time *t* = 0, its displacement will be half of its amplitude

$\frac{1}{8}$ *sec*

$\frac{1}{6}$ *sec*

$\frac{1}{4}$ *sec*

$\frac{1}{3}$ *sec*

7.A wire of resistance R is divided in 10 equal parts. These parts are connected in parallel, the equivalent resistance of such connection will be

0.01 R

0.1 R

10 R

100 R

8.A block of mass 5 kg is on a rough horizontal surface and is at rest. Now a force of 24 N is imparted to it with negligible impulse. If the coefficient of kinetic friction is 0.4 and g=10m/s2, then the acceleration of the block is

0.26 m/s2

0.39m/s2

0.69 m/s2

0.88 m/s2

9.In a metre bridge experiment, null point is obtained at 20 cm from one end of the wire when resistance X is balanced against another resistance Y. If X<Y, then where will be the new position of the null point from the end, if one decides to balance a resistance of 4X against Y?

50 cm

80 cm

40 cm

70 cm

10.A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $\frac{4}{3}$ and the fish is 12 cm below the surface, the radius of this circle in cm is

$36\sqrt{5}$

$4\sqrt{5}$

$36\sqrt{7}$

$\frac{36}{\sqrt{7}}$

11.In a capillary tube, water rises by 1.2 mm. The height of water that will rise in another capillary tube having half the radius of the first, is

1.2 mm

2.4 mm

0.6 mm

0.4 mm

12.If R = universal gas constant, what is the amount of heat needed to raise the temperature of 2 mole of an ideal monoatomic gas from 273K to 373K when no work is done?

100 R

150 R

300 R

500 R

13.The series $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \ldots$ evaluates to:

e^2

$\ln 2$

$\ln(1/2)$

none of these

14.If $1, a$ and 2 are in HP, then the value of a is:

$3/4$

$2/3$

$4/3$

none of these

15.The angle between the pair of lines $2x^2 - 4xy - 2y^2 = 0$ is:

0^o

60^o

90^o

none of these

16.$1 + i + i^2 + i^3 + \cdots + i^{99} =$

1

i

0

none of the above

17.

$$(r\,.\,i)^2 + (r\,.\,j)^2 + (r\,.\,k)^2 =$$

$3r^2$

r^2

0

None of these

18.The dot product of two unit vectors is 0.5. The angle between them is:

30°

60°

90°

none of the above

19.The equation of the straight line passing through the point (3, 2) and perpendicular to the line y = x is :

$x - y = 5$

$x + y = 5$

$x + y = 1$

$x - y = 1$

20.The remainder when $x^3 - 5x^2 + 4x + 8$ is divided by $x + 5$ is:

262

-262

28

-28

21.If the coordinates of the points A, B, C be (– 1, 5), (0, 0) and (2, 2) respectively and D be the middle point of BC, then the equation of the perpendicular drawn from B to the line AD is

$x + 2y = 0$

$2x + y = 0$

$x - 2y = 0$

$2x - y = 0$

22.The number of solutions to the equation $(\ln x)^2 - 4 \ln x + 4 = 0$ is

1

2

0

infinite

23.The line $x \cos \alpha + y \sin \alpha = p$ will be a tangent to the circle $x^2 + y^2 - 2ax \cos \alpha - 2ay \sin \alpha = 0$, if $p =$

0 or a

0

$2a$

0 or $2a$

24.If the centroid of triangle whose vertices are $(a, 1, 3), (-2, b, -5)$ and $(4, 7, c)$ be the origin, then the values of a, b, c are

- 2, -8, -2

2, 8, -2

-2, -8, 2

7, -1, 0

25.The sum of $\frac{1}{2}+\frac{1}{3}.\frac{1}{2^3}+\frac{1}{5}.\frac{1}{2^5}+.....\infty$ is

$\log_e \sqrt{\frac{3}{2}}$

$\log_e \sqrt{3}$

$\log_e \sqrt{\frac{1}{2}}$

$\log_e 3$

26.16^{th} term in the expansion of $(\sqrt{x}-\sqrt{y})^{17}$ is

$136xy^7$

$136xy$

$-136xy^{15/2}$

$-136xy^2$

27.If $\tan^2\theta-(1+\sqrt{3})\tan\theta+\sqrt{3}=0$, then the general value of θ is :

$n\pi+\frac{\pi}{4}, n\pi+\frac{\pi}{3}$

$n\pi-\frac{\pi}{4}, n\pi+\frac{\pi}{3}$

$n\pi+\frac{\pi}{4}, n\pi-\frac{\pi}{3}$

$n\pi-\frac{\pi}{4}, n\pi-\frac{\pi}{3}$

28.The first term of a G.P. whose second term is 2 and sum to infinity is 8, will be

6

3

4

1

29.Which of the following pairs are not isomeric compounds ?

Ethyl ethanoate and methyl propanoate

Butanone and butanal

Ethoxy propane and propoxy ethane

Methoxy methane and ethanol

30.Nitrogen is obtained when $NaNO_2$ reacts with

NH_4Cl

NH_4NO_3

$(NH_4)_2 CO_3$

NH_4OH

31.$2H^+ (aq) + 2e^- \rightarrow H_2 (g)$.The standard electrode potential for the above reaction is (in volts)

0

- 1

1

None of these

32.Complex is formed in the extraction of

Na

Cu

Ag

Fe

33.Equilibrium coonstants K1 and K2 for the following equilibria is $NO(g) + \frac{1}{2}O_2 \overset{K_1}{\longrightarrow} NO_2(g)$ and $2NO_2(g) \overset{K2}{\longrightarrow} NO(g) + O_2(g)$

$K_2 = \frac{1}{K_1}$

$\mathrm{K_2 = K_1^2}$

$K_2 = \frac{K_1}{2}$

$K_2 = \frac{1}{K_1^2}$

34.A monoprotic acid in 1.00 M solution is 0.01% ionised. The dissociation constant of this acid is

10-8

10-4

10-6

10-5

35.At 90^oC pure water has $[H_3O^+] = 10^{-6}\ M$, the value of K_w at this temperature will be

10^{-6}

10^{-12}

10^{-14}

10^{-8}

36.How many isomers are possible for $C_4H_{10}O$?

3

4

5

7

37.Bhaktapur is famous ___ its JuJu-Dhau.

in

about

to

for

38.Let me carry this bag for you,____?

shall we

shall I

will you

will I

39.Which of the following is a verb?

spectacular

marvel

comparable

fancy

40.I hardly remember her face.

noun

verb

adverb

adjective