2021-12-18

1.In the circuits shown below, the readings of voltmeters and the ammeters will be

$\mathrm{V}_2 > \mathrm{V}_1$ and $i_1 = i_2$

$\mathrm{V}_2 = \mathrm{V}_1$ and $i_1 > i_2$

$\mathrm{V}_2 = \mathrm{V}_1$ and $i_1 = i_2$

$\mathrm{V}_2 > \mathrm{V}_1$ and $i_1 > i_2$

2.Speed of light is maximum in

Water

Air

Glass

Diamond

3.Let n_P and n_e be the number of holes and conduction electrons respectively in a semiconductor. Then

$n_P > n_e$ in an intrinsic semiconductor

$n_P = n_e$ in an extrinsic semiconductor

$n_P = n_e$ in an intrinsic semiconductor

$n_e > n_P$ in an intrinsic semiconductor

4.Field at the centre of a circular coil of radius *r*, through which a current *I* flows is

Directly proportional to *r*

Inversely proportional to *I*

Directly proportional to *I*

Directly proportional to I^2

5.Two point charges 3 * 10–6 C and 8 * 10–6 C repel each other by a force of 6 * 10–3 N. If each of them is given an additional charge – 6 * 106 C, the force between them will be

2.4 * 10–3 N (repulsive)

2.4 * 10–3 N (attractive)

1.5 * 10–3 N (repulsive)

1.5 * 10–3 N (attractive)

6.The resultant of two rectangular simple harmonic motions of the same frequency and unequal amplitudes but differing in phase by $\frac{\pi}{2}$ is

Simple harmonic

Circular

Elliptical

Parabolic

7.In the circuit, the galvanometer G shows zero deflection. If the batteries A and B have negligible internal resistance, the value of the resistor R will be

500 Ω

1000 Ω

200 Ω

100 Ω

8.A vessel contains 110 g of water. The heat capacity of the vessel is equal to 10 g of water. The initial temperature of water in vessel is 10°C. If 220 g of hot water at 70°C is poured in the vessel, the final temperature neglecting radiation loss, will be

70°C

80°C

60°C

50°C

9.Four spheres of diameter 2a and mass M are placed with their centres on the four corners of a square of side b. Then moment of inertia of the system about an axis about one of the sides of the square is

$Ma^2 + 2Mb^2$

Ma^2

$Ma^2 + 4Mb^2$

$\frac{8}{5}Ma^2 + 2Mb^2$

10.A bullet moving with a speed of 100 m/s can just penetrate two planks of equal thickness. Then the number of such planks penetrated by the same bullet when the speed is doubled will be

4

8

6

10

11.The moment of inertia of a thin square plate ABCD of uniform thickness about an axis passing through the centre O and perpendicular to the plane of the plate is I. Which of the following is false?

$I = I_1 + I_2$

$I = I_1 + I_3$

$I = I_4 + I_2$

$I = I_1 + I_2 + I_3 + I_4$

12.A ball of radius r and density ρ falls freely under gravity through a distance h before entering water. Velocity of ball does not change even on entering water. If viscosity of water is η, the value of h is given by

$\frac{2}{9}r^2\left(\frac{1-\rho}{\eta}\right)g$

$\frac{2}{81}r^2\left(\frac{\rho-1}{\eta}\right)g$

$\frac{2}{81}r^4\left(\frac{\rho-1}{\eta}\right)^2 g$

$\frac{2}{9}r^4\left(\frac{\rho-1}{\eta}\right)^2 g$

13.The number of bijections possible between two sets of n elements is:

n^2

$2n$

$n!$

none of these

14.$a \,.\, b = 0,$ then

$a \perp b$

$a = b = 0$

$a = 0$ or $b = 0$

(a) or (d)

15.If two complex numbers are conjugate of each other, and are plotted on the Argand plane, then the numbers on the axis about which those two numbers are mirror images will have:

equal real and imaginary parts

zero real part

zero imaginary part

none of these

16.

$$\cot\ \left[\cos^{-1}\left(\frac{7}{25}\right)\right] =$$

$\frac{25}{24}$

$\frac{25}{7}$

$\frac{24}{25}$

None of these

17.The angle between two vectors is:

always acute

never obtuse

is between 0o and 180o

is between 0o and 360o

18.The number of solutions of $y = cosx$ and $y = x$ is:

1

2

infinite

0

19.The value of $4^{1/3}.4^{1/9}.4^{1/27}.....\infty$ is

2

3

4

9

20.The equation of a hyperbola is $x^2 - 2y^2 = 1$. What is the ellipse bounded by the vertices of this hyperbola and its conjugate?

$x^2 + 2y^2 = 1$

$2x^2 + y^2 = 1$

$2x^2 + y^2 = 2$

none of these

21.A parabola is inscribed in a parallelogram of area A such that the axis of parabola is parallel to one side of the parallelogram. What is the area of larger region of their intersection ?

$\frac{2}{3}A$

$\frac{1}{3}A$

$\frac{4}{5}A$

none of these

22.If $y = f(x) = \frac{x+2}{x-1}$ then $x =$

$f(y)$

$2f(y)$

$\frac{1}{f(y)}$

none of these

23. $\int \cos(\ln x)dx =$

$\frac{x}{2}(\cos \ln x - \sin \ln x) + c$

$\frac{x}{2}(\cos \ln x + \sin \ln x) + c$

$\frac{x}{2}(\sin \ln x - \cos \ln x) + c$

none of these

24.Which of the following is not true about a function $f(x)$?

If $f(x)$ is continuous in an interval, it has finite global maxima in the interval.

If $f(x)$ is differentiable in an interval, it has finite local maxima in the interval.

If $f(x)$ is differential in an interval, it is continuous in the interval.

none of above

25.The line $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ is parallel to the plane

$2x+3y+4z=29$

$3x+4y-5z=10$

$3x+4y+5z=38$

$x+y+z=0$

26.The area bounded by $y=\sin\sqrt{x}$ between *x* = 0 and $x=\frac{\pi^2}{4}$ is:

1

$\frac{1}{2}$

$\frac{3}{2}$

none of these

27.The unit vector along the difference of $i+2j-3k$ and $3i-2j+k$ is:

$\frac{1}{3}(i+2j+2k)$

$\frac{1}{3}(-i-2j+2k)$

$\frac{1}{3}(i-2j+2k)$

none of these

28.If $x=\frac{1-t^2}{1+t^2}$ and $y=\frac{2t}{1+t^2}$, then $\frac{dy}{dx}=$

$\frac{-y}{x}$

$\frac{y}{x}$

$\frac{-x}{y}$

$\frac{x}{y}$

29.The current required to liberate 1cc of O_2 gas per second by electrolysis of water is

34.46A

8.61A

4.3A

17.23A

30.The conjugate acid of NH2- is -

NH3

NH2OH

NH4+

ClO4-

31.The conjugate base of $(NH_2)^-$ IS

NH_3

NH^{2-}

NH_4^+

N_3^-

32.The four quantum number for the valence shell electron or last electron of sodium (Z = 11) is

$n = 2,\ l = 1,\ m = -1,\ s = -\frac{1}{2}$

$n = 3,\ l = 0,\ m = 0,\ s = +\frac{1}{2}$

$n = 3,\ l = 2,\ m = -2,\ s = -\frac{1}{2}$

$n = 3,\ l = 2,\ m = 2,\ s = +\frac{1}{2}$

33.Total vol. of gases produced by electrolysis of aq. NaCl using 6 amp. for 2hrs is

5 lit

15 lit

7.5 lit

10 lit

34. The vapor density of metal chloride is 59.5 and the specific heat capacity of the metal is 0.13. Find the equivalent weight of the metal.

9

12

24.5

49

35.When treated with ammoniacal cuprous chloride, which one among the following forms copper derivative

C_2H_6

C_2H_4

C_2H_2

C_6H_6

36.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}

37.This is so tasty,____?

isn’t this

isn’t is

isn’t it

is it

38.Synonym of fostering:

safeguarding

ignoring

nurturing

neglecting

39.Which of the following is a verb?

timid

particular

shorten

monthly

40.If you get stuck, ___ me.

text

texted

will text

texts