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1.The ratio of kinetic energy to the total energy of an electron in a Bohr orbit of the hydrogen atom, is

2:-1

1:-1

1:1

1:-2

2.The frequency of a light ray is  $6 \times 10^{14} \text{ Hz}$ . Its frequency when it propagates in a medium of refractive index 1.5, will be

$1.67 \times 10^{14} \text{ Hz}$

$9.10 \times 10^{14} \text{ Hz}$

$6 \times 10^{14} \text{ Hz}$

$4 \times 10^{14} \text{ Hz}$

3.Out of the following statements which is not correct?

When unpolarized light passes through a Nicol's prism, the emergent light is elliptically polarized.

Nicol's prism works on the principle of double refraction and total internal reflection.

Nicol's prism can be used to produce and analyze polarized light.

Calcite and Quartz are both doubly refracting crystals.

4.A body of mass  $m$  is thrown upwards at an angle  $\theta$  with the horizontal with velocity  $v$ . While rising up the velocity of the mass after  $t$  seconds will be

$$\sqrt{(v \cos \theta)^2 + (v \sin \theta)^2}$$

$$\sqrt{(v \cos \theta - v \sin \theta)^2 - gt}$$

$$\sqrt{v^2 + g^2 t^2 - (2v \sin \theta)gt}$$

$$\sqrt{v^2 + g^2 t^2 - (2v \cos \theta)gt}$$

5.If the velocity of light ( $c$ ), gravitational constant ( $G$ ) and Planck's constant ( $h$ ) are chosen as fundamental units, then the dimensions of mass in new system is

$$c^{1/2} G^{1/2} h^{1/2}$$

$$c^{1/2} G^{1/2} h^{-1/2}$$

$$c^{1/2} G^{-1/2} h^{1/2}$$

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$$c^{-1/2}G^{1/2}h^{1/2}$$

6. An electron moving with the speed  $5 \times 10^6$  metre per sec is shot parallel to the electric field of intensity  $1 \times 10^3 \text{ N/C}$ . Field is responsible for the retardation of motion of electron. Now evaluate the distance travelled by the electron before coming to rest for an instant (mass of  $e = 9 \times 10^{-31} \text{ Kg}$  charge  $= 1.6 \times 10^{-19} \text{ C}$ )

7 m

0.7 mm

7 cm

0.7 cm

7. A thin oil layer floats on water. A ray of light making an angle of incidence of  $40^\circ$  shines on oil layer. The angle of refraction of light ray in water is ( $\mu_{oil} = 1.45$ ,  $\mu_{water} = 1.33$ )

$36.1^\circ$

$44.5^\circ$

26.  $8^\circ$

$28.9^\circ$

8. When a current of 5 mA is passed through a galvanometer having a coil of resistance 15  $\Omega$ , it shows full scale deflection. The value of the resistance to be put in series with the galvanometer to convert it into a voltmeter of range 0 – 10V is

$2.535 \times 10^3 \Omega$

$4.005 \times 10^3 \Omega$

$1.985 \times 10^3 \Omega$

$2.045 \times 10^3 \Omega$

9. A rubber ball is dropped from a height of 5 m on a planet where the acceleration due to gravity is not known. On bouncing, it rises to 1.8 m. The ball loses its velocity on bouncing by a factor of

16/25

2/5

3/5

9/25

10. With respect to a rectangular cartesian coordinate system, three vectors are expressed as  $\vec{a} = 4\hat{i} - \hat{j}$ ,  $\vec{b} = -3\hat{i} + 2\hat{j}$  and  $\vec{c} = -\hat{k}$  where  $\hat{i}$ ,  $\hat{j}$ ,  $\hat{k}$  are unit vectors, along the X, Y and Z-axis respectively. The unit vector along the direction of sum of these vector is

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$$\hat{r} = \frac{1}{\sqrt{3}}(\hat{i} + \hat{j} - \hat{k})$$

$$\hat{r} = \frac{1}{\sqrt{2}}(\hat{i} + \hat{j} - \hat{k})$$

$$\hat{r} = \frac{1}{3}(\hat{i} - \hat{j} + \hat{k})$$

$$\hat{r} = \frac{1}{\sqrt{2}}(\hat{i} + \hat{j} + \hat{k})$$

11. In an electrolyte  $3.2 \times 10^{18}$  bivalent positive ions drift to the right per second while  $3.6 \times 10^{18}$  monovalent negative ions drift to the left per second. Then the current is

1.6 amp to the left

1.6 amp to the right

0.45 amp to the right

0.45 amp to the left

12. If the K.E. of a body is increased by 300%, its momentum will increase by

100%

150%

$\sqrt{300}$

175%

13. If  ${}^nC_r = {}^nP_r$  then  $r =$

0

1

2

(a) or (b)

14. The equations  $x = \frac{t}{4}, y = \frac{t^2}{4}$  represent:

A circle

A parabola

An ellipse

A hyperbola

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15.If  $A$  and  $B$  are two non-empty sets,  $(A \cap \overline{B}) =$

$A \cap B$

$A \cup B$

$A$

$A \setminus B$

16.The vertex of parabola  $(y - 2)^2 = 16(x - 1)$  is

$(2,1)$

$(1,-2)$

$(-1,2)$

$(1,2)$

17.If  $x = a(t - \sin t)$  and  $y = a(1 - \cos t)$ , then  $\frac{dy}{dx} =$

$\tan\left(\frac{t}{2}\right)$

$-\tan\left(\frac{t}{2}\right)$

$\cot\left(\frac{t}{2}\right)$

$-\cot\left(\frac{t}{2}\right)$

18.

$$\int_0^1 0 dx =$$

0

constant

not determined

meaningless

19.If  $\vec{a}, \vec{b}, \vec{c}$  represent three sides of a triangle in order, then,  $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a} =$

0

$\frac{1}{2}(a^2 + b^2 + c^2)$

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$$-\frac{1}{2}(a^2 + b^2 + c^2)$$

can't be determined

20.

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} =$$

0

1/2

1/3

1/4

21.  $\frac{d}{dx} \tan^{-1} \left( \frac{ax - b}{bx + a} \right) =$

$$\frac{1}{1 + x^2} - \frac{a^2}{a^2 + b^2}$$

$$\frac{-1}{1 + x^2} - \frac{a^2}{a^2 + b^2}$$

$$\frac{1}{1 + x^2} + \frac{a^2}{a^2 + b^2}$$

None of these

22. If a particle moves such that the displacement is proportional to the square of the velocity acquired, then its acceleration is

Proportional to  $s^2$

Proportional to  $1 \text{ over } s^2$

Proportional to  $s$

constant

23. If the co-ordinates of the points  $A, B, C, D$  be  $(2, 3, -1), (3, 5, -3), (1, 2, 3)$  and  $(3, 5, 7)$  respectively, then the projection of  $AB$  on  $CD$  is :

0

1

2

$\sqrt{3}$

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24.

$$\lim_{x \rightarrow 0} \frac{a^{\sin x} - 1}{b^{\sin x} - 1} =$$

$$\frac{a}{b}$$

$$\frac{b}{a}$$

$$\frac{\log a}{\log b}$$

$$\frac{\log b}{\log a}$$

25. The range of  $f(x) = \sec\left(\frac{\pi}{4}\cos^2 x\right)$ ,  $-\infty < x < \infty$  is

$$[1, \sqrt{2}]$$

$$[1, \infty)$$

$$[-\sqrt{2}, -1] \cup [1, \sqrt{2}]$$

$$(-\infty, -1] \cup [1, \infty)$$

26. If 2 is a root of  $x^2 - 3ax + a^2 = 0$ , then  $a =$

can't be determined

$$3 + \sqrt{5}$$

$$5 - \sqrt{3}$$

$$3 \pm \sqrt{5}$$

27.  $(A \Delta B) \Delta A =$

$$A - B$$

$$A$$

$$B$$

$$A \cap B$$

28. Let  $A_n = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}^n$ . Then,  $|A_n| =$

$$1$$

$$(-1)^n$$

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0

can't be determined

29.The hybridization of carbon in carbocation is

$sp$

$sp^2$

$sp^3$

$sp^2d^2$

30.Amongst  $LiCl$ ,  $RbCl$ ,  $BeCl_2$  and  $MgCl_2$ . Maximum and minimum ionic character will be shown by the compounds

$LiCl$ ,  $MgCl_2$

$RbCl$ ,  $BeCl_2$

$RbCl$ ,  $MgCl_2$

$MgCl_2$ ,  $BeCl_2$

31.Ozone deplect due to the formation of following compound in Antarctica

Acrolein

Peroxy acetyl nitrate

$SO_2$  and  $SO_3$

Chlorine nitrate

32.Sodium gives blue colour with  $NH_3$  solution, this blue colour is due

Ammoniated  $Na^+$

Ammoniated  $Na^-$

Ammoniated  $e^-$

$Na^+/Na^-$  pair

33.0.16g of magnesium metal on reaction with an acid gave 0.987g of magnesium salt. The equivalent weight of acid is

46

49

60

63

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34. IUPAC name of  $CH_3 - CH = CH - C \equiv CH$  is

Pent-2-en-4-yne

Pent-3-en-1-yne

Pent-3-yne-1-en

Pent-2-yne-1-en

35. Chlorine reacts with sodium hydroxide under various conditions to give

Sodium chloride

Sodium hypochlorite

Sodium chlorate

All of these

36. The weight of a residue obtained by heating 2.76 g of silver carbonate is

2.76 g

2.98 g

2.16 g

2.44 g

37. Sher Bahadur Deuba is our ex ( ) Prime Minister.

(,)

(;)

(:)

(-)

38. One who abandons his religious faith:

atheist

apostate

prostate

agnostic

39. She decided to give up .... after her mother's death due to cancer.

smoke

smoking



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to smoking

to smoke

40.The teacher asked us to \_\_\_\_ our pens on the desk.

lie

lied

lay

lays