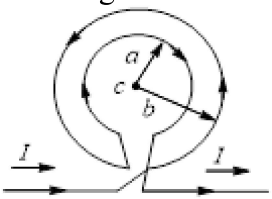
Date :-15/01/2022 **Time :-50 Minutes** **Exam Name :-IIT-JEE-1to1Guru-2** **Mark :- 84**

1. An otherwise infinite, straight wire has two concentric loops os radii a and b carrying equal currents in opposite directions as shown in figure. The magnetic field at the common centre is zero for



(a) $\frac{a}{b}=\frac{\pi-1}{\pi}$ **(b)** $\frac{a}{b}=\frac{\pi}{\pi+1}$ **(c)** $\frac{a}{b}=\frac{\pi-1}{\pi+1}$

(d) $\frac{a}{b}=\frac{\pi+1}{\pi-1}$

2. The period of oscillation of a simple pendulum of length L suspended from the roof of a vehicle which moves without friction down an inclined plane of inclination α, is given by

(a) $2\pi\sqrt{\frac{L}{g\cos\alpha}}$ **(b)** $2\pi\sqrt{\frac{L}{g\sin\alpha}}$ **(c)** $2\pi\sqrt{\frac{L}{g}}$

(d) $2\pi\sqrt{\frac{L}{g\tan\alpha}}$

3. Two equal negative charge q are fixed points (0, a) and (0,-0) on the Y-axis. A positive charge Q is released from rest at point (2a, 0) on the X-axis. The charge Q will

(a) execute SHM about origin **(b)** move to infinity

(c) Move to the origin and remained at rest

(d) execute oscillatory but not SHM

4. A thin bar of length L has a mass per unit length λ, that increases linearly with distance from one end. If its total mass is M and its mass per unit length at the lighter end is λ_0, then the distance of the centre of mass from the lighter end is: [Online April 11, 2014]

(a) $\frac{L}{2}-\frac{\lambda_0 L^2}{4M}$ **(b)** $\frac{L}{3}+\frac{\lambda_0 L^2}{8M}$ **(c)** $\frac{L}{3}+\frac{\lambda_0 L^2}{4M}$ **(d)** $\frac{2L}{3}-\frac{\lambda_0 L^2}{6M}$

5. If the resultant of $\vec{A}$ and $\vec{B}$ makes angle α with $\vec{A}$ and β with $\vec{B}$ then

(a) $\alpha<\beta$ always **(b)** $\alpha<\beta$, if $A<B$

(c) $\alpha<\beta$, if $A>B$ **(d)** $\alpha<\beta$, if $A=B$

6. A ray of light is incident at an angle of $60°$ on one face of a prism which has refracting angle of $30°$. The ray emerging out of the prism makes an angle of $30°$ with the incident ray. If the refractive index of the material of the prism is $\mu=\sqrt{a}$, find the value of a

7. Find recoil speed (approximately in m/se

8. Fermy s salt is:

(a) HF **(b)** KHF_2 **(c)** NaCl **(d)** $KClO_3$

9. Electromeric effect is

(a) Permanent effect **(b)** Temporary effect

(c) Resonance effect **(d)** Inductive effect

10. A hypothetical reaction $A\rightarrow 2B$, proceeds through following sequence of steps (i) $A\rightarrow C;\Delta H=q$ (ii) $C\rightarrow D;\Delta H=v$ (iii) $\frac{1}{2}D\rightarrow B;\ \Delta H=x$ Then the heat of reaction i

(a) $q-v+2x$ **(b)** $q+v-2x$ **(c)** $q+v+2x$

(d) $q+2v-2x$

11. In the leaching of Ag_2S with NaCN, a stream of air is also passed. It is because of

(a) Reversible nature of reaction between Ag_2S and NaCN

(b) To oxide Na_2S formed into $Na_2S_2O_3$ and sulphur

(c) Both (a) and (b) **(d)** None of the above

12. The value of enthalpy change (ΔH) for the reaction $C_2H_5OH(l)+3O_2(g)\rightarrow 2CO_2(g)+3H_2O(l)$, at 27 °C is -1366.5 kJ mol^{-1}. The value of internal energy change for the above reaction at this temperature will be

(a) -1371.5 kJ **(b)** -1369.0 kJ **(c)** -1364.0 kJ

(d) -1361.5 kJ

13. A saturated solution of silver bromide is made in 10^{-7} (M) $AgNO_3$ solution

14. The total number of C-atoms in β-D fructofuranose are:

15. If $y=\cos^{-1}(\log_2 x)$, then $\frac{dy}{dx}=$

(a) $\frac{1}{x\sqrt{1-(\log_2 x)^2}}$ **(b)** $\frac{-1}{x\sqrt{1-(\log_2 x)^2}}$

(c) $\frac{1}{x\log 2\sqrt{1-(\log_2 x)^2}}$ **(d)** $\frac{-1}{x\log 2\sqrt{1-(\log_2 x)^2}}$

16. The number of ways in which mn students can be distributed equal among n sections, is

(a) $(mn)^n$ **(b)** $\frac{(mn)!}{(m!)^n}$ **(c)** $\frac{(mn)!}{m!}$ **(d)** $\frac{(mn)!}{m!\,n!}$

17. Let $f: R \to, g: R \to R$ be two functions given by $f(x) = 2x - 3, g(x) = x^3 + 5$. Then, $(fog)^{-1}(x)$ is equal to

(a) $\left(\frac{x+7}{2}\right)^{1/3}$ **(b)** $\left(x - \frac{7}{2}\right)^{1/3}$ **(c)** $\left(\frac{x-2}{7}\right)^{1/3}$

(d) $\left(\frac{x-7}{2}\right)^{1}$

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

(a) $x = f(y)$ **(b)** $f(1) = 3$

(c) y increase with x for $x < 1$

(d) f is a rational function of x

19. $\int_0^{\pi} \frac{x\,dx}{a^2\cos^2 x + b^2\sin^2 x}$ is equal to

(a) $\frac{\pi}{ab}$ **(b)** $\frac{\pi}{2ab}$ **(c)** $\frac{\pi^2}{ab}$ **(d)** $\frac{\pi^2}{2ab}$

20. The number of circles belonging to the system of circles $2(x^2 + y^2) + \lambda x - (1 + \lambda^2)y - 10 = 0$ and orthogonal to $x^2 + y^2 + 4x + 6y + 3 = 0$, is

21. Let $0 < \theta < p$, the area of the Δ formed by the vertices (-1, 0), (1, 0) and (cos θ , sin θ) can not be greater than