

- 1 If p and q are the lengths of the perpendiculars from the origin on the tangent and the normal to the curve

$$x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}, \text{ then } 4p^2 + q^2 =$$

- (A) a (B) a^2 (C) $2a^2$ (D) $5a^2$

- 2 What is the differential equation of the family of circles having their centres on the y -axis ?

- (A) $xy'' - (y')^3 - y' = 0$ (B) $xy'' + (y')^3 + y' = 0$
 (C) $y'' - (y')^3 + xy' = 0$ (D) $y'' + (y')^3 + xy' = 0$

3 $\int \frac{x e^x}{(x+1)^2} dx =$

- (A) $\frac{e^x}{x+1} + c$ (B) $-\frac{e^x}{x+1} + c$
 (C) $\frac{e^x}{(x+1)^2} + c$ (D) $-\frac{e^x}{(x+1)^2} + c$

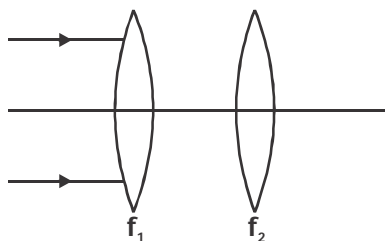
4 $f(x) = \frac{1}{1 + \frac{1}{x}}; g(x) = \frac{1}{1 + \frac{1}{f(x)}} \Rightarrow g'(2) =$

- (A) $\frac{1}{5}$ (B) $\frac{1}{25}$ (C) 5 (D) $\frac{1}{16}$

- 5 If $2i + 3j - 6k$, $6i - 2j + 3k$, $3i - 6j - 2k$ represent the sides of a triangle, find the perimeter of the triangle.

- (A) 14 (B) 21
 (C) 7 (D) 6

- 6 Parallel beam of light is incident on the system of two convex lenses of focal length $f_1 = 20$ cm and $f_2 = 10$ cm as shown below.

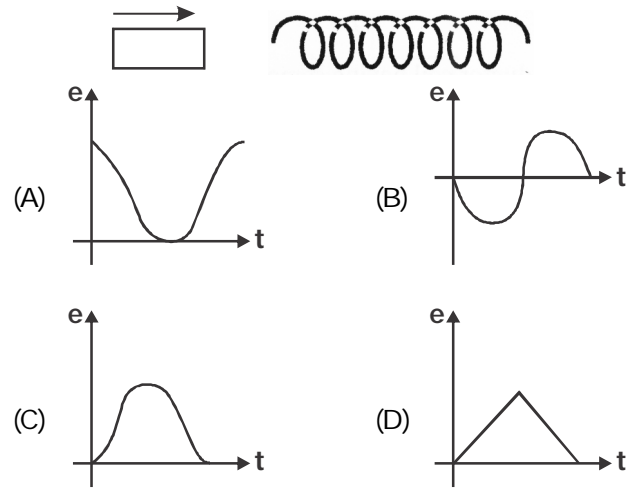


What should be the distance between the two lenses so that rays after refraction from both the lenses pass undeviated ?

- (A) 60 cm (B) 30 cm
 (C) 90 cm (D) 40 cm
- 7 Suppose we have a large number of identical particles, very small in size. Any of them at 10 cm separation repel with a force of 3×10^{-10} N. If you measure the repulsion and find it to be 6×10^{-6} N; how many particles were there in the group ?
- (A) 2×10^4 (B) 4×10^6
 (C) 6×10^8 (D) 8×10^{10}
- 8 How much U^{235} is consumed in a day in an atomic power house operating at 400 MW, provided the whole of the mass of U^{235} is converted into energy?
- (A) 0.115 g (B) 0.384 g
 (C) 0.597 g (D) 0.908 g

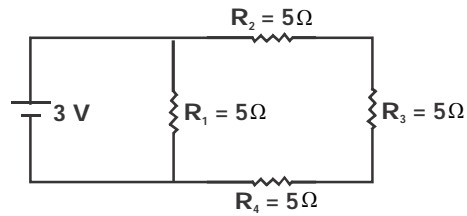
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The variation of induced emf (e) with time (t) in a coil if a short bar magnet is moved along its axis with a constant velocity is best represented as :



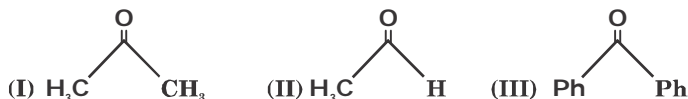
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The value of current i in the circuit shown below is



- (A) 1.8 A (B) 0.8 A
(C) 0.2 A (D) 1.6 A

11 The order of reactivity of phenyl magnesium bromide with the following compounds is



- (A) (II) > (III) > (I)
 (B) (I) > (III) > (II)
 (C) (II) > (I) > (III)
 (D) All react with the same rate

12 Doping of silicon with P or Al increases the conductivity. The difference in the two cases is

- (A) P is non-metal whereas Al is a metal
 (B) P is a poor conductor while Al is a conductor
 (C) P gives rise to extra electrons while Al gives rise to holes
 (D) P gives rise to holes while Al gives rise to extra electrons.

13 The vapour pressure of a pure liquid A is 40 mm Hg at 310 K. The vapour pressure of this liquid in a solution with liquid B is 32 mm Hg. Calculate the molefraction of A in the solution if it obeys the Raoult's law.

- (A) 0.3 (B) 0.5
 (C) 0.8 (D) 0.11

14 What may be expected to happen when phosphine gas is mixed with chlorine gas?

- (A) the mixture only cools down
 (B) PCl_3 and HCl are formed and the mixture warms up
 (C) PCl_5 and HCl are formed and the mixture cools down.
 (D) $\text{PH}_3 \cdot \text{Cl}_2$ is formed with warming up.

- 15 What is the standard cell potential for the cell
 $\text{Zn} ; \text{Zn}^{2+} (1\text{M}) \parallel \text{Cu}^{2+} (1\text{M}) ; \text{Cu} ?$
(E° for $\text{Zn}^{2+} / \text{Zn} = - 0.76$; E° for $\text{Cu}^{2+} / \text{Cu} = + 0.34$)
- (A) $- 0.76 + (- 0.34) = - 0.42 \text{ V}$
(B) $- 0.34 + 0.76 = + 0.42 \text{ V}$
(C) $0.34 - (- 0.76) = + 1.10 \text{ V}$
(D) $- 0.76 - (+ 0.34) = - 1.10 \text{ V}$

Class : XII**General Awareness**

- 16 Who has been presented with the "Honoured Guest" award by the U.S. state of Texas for his contribution to cinema and art in 2015 ?
- (A) Shahrukh Khan (B) Anupam Kher
(C) Amitabh Bachan (D) Aamir Khan
- 17 Aviation giant Boeing is a company of which country ?
- (A) Australia (B) Russia
(C) America (D) Japan
- 18 Which corporate company has a slogan "Powered by intellect. Driven by values" ?
- (A) TCS (B) Wipro
(C) Infosys (D) HCL
- 19 Who has won Mixed Doubles in the US Open Tennis Championship in 2015 ?
- (A) Roberta Vinci and Simona Halep
(B) Nicolas Mahut and Sam Querrey
(C) Leander Paes and Martina Hingis
(D) Roberta Vinci and Nicolas Mahut
- 20 Name the youngest singer entry in Forbes most powerful women list 2015.
- (A) Taylor Swift (B) Rihanna
(C) Lady Gaga (D) Katy Perry