29. Two pith balls, each of mass 1.8 gm are suspended from the same point by silk threads each of length 20 cm. When equal charge Q is given to both the balls, they separate until the two threads become perpendicular. Then the charge Q on each pith ball is $[1/(4\pi\epsilon_0) = 9 \times 10^9$ N m^2/C$^2]$.

(A) 2×10^{-7} C.

(B) 3×10^{-7} C.

(C) 4×10^{-7} C.

(D) 5×10^{-7} C.

30. In an LCR circuit at resonance, the current and the applied voltage

(A) are in phase.

(B) differ in phase by π.

(C) differ in phase by $\pi/2$.

(D) differ in phase by $-\pi/2$.

31. Unpolarised light is sent through two polarisers oriented at an angle θ with respect to each other. If the ratio of the transmitted intensity to the incident intensity is found to be 1/4, the angle θ must be

(A) $\pi/4$.

(B) $\pi/8$.

(C) $\pi/2$.

(D) 0.

32. For the function

$$\begin{aligned} f(x) &= 1/|x| & |x| \geq 1 \\ &= ax^2 + b & |x| < 1 \end{aligned}$$

to be continuous and differentiable at every point, a and b should have values

(A) $a = 1, b = 0$.

(B) $a = 1/2, b = 1/2$.

(C) $a = -1/2, b = 3/2$.

(D) $a = 1/2, b = 3/2$.