A. The distance 's' in meters traveled by a particle in 't' seconds is given by s = 2t3/3-18t+5/3. The acceleration when the particle comes to rest is -

1. **12 m2/sec**
2. 3 m2/sec
3. 18 m2/sec
4. 10 m2/sec

B. An enemy fighter jet is flying along the curve given by y = x2 + 2. A soldier is placed at (3, 2) and wants to shoot down the jet when it is nearest to him. Then the nearest distance is

1. 2 units
2. √3 units
3. **√5 units**
4. √6 units

C. If y = (x - 1)2 (x - 2)3 (x - 3)5 then dy/dx at x = 4 is equal to -
1. 108
2. 54
3. 36
4. **516**

D. A particle starts from rest and its angular displacement (in radians) is given by θ= t2/20+t/5. If the angular velocity at the end of t = 4 is k, then the value of 5k is

1. 0.6
2. 5
3. 5000
4. **3**

E. A positively charged glass rod is brought near an uncharged metal sphere, which is mounted on an insulated stand. If the glass rod is removed, the net charge on the metal sphere is

1. **Zero**
2. 1.6 × 10-19 C
3. Positive Charge
4. Negative Charge

F. A uniform electric field vector E exists along the horizontal direction as shown. The electric potential at A is VA. A small point charge q is slowly taken from A to B along the curved path as shown. The potential energy of the charge, when it is at point B, is
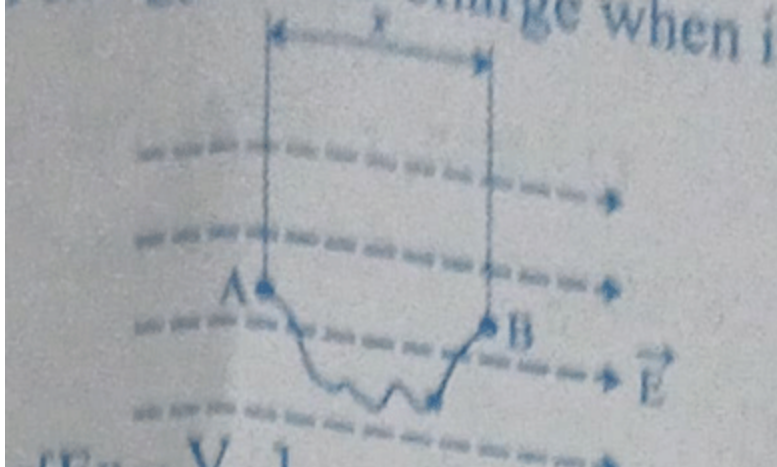
1. q[VA + Ex]
2. q[Ex - VA]
3. qEx
4. **q[VA - Ex]**

G. For a charged spherical ball, electrostatic potential inside the ball varies with r as V=2ar2+b. Here, a and b are constant and r is the distance from the center. The volume charge density inside the ball is $-\lambda a\varepsilon$. The value of λ is _____. (ε= permittivity of the medium)
Correct Answer: 12

H. A moving coil galvanometer is converted into an ammeter of range 0 to 5mA. The galvanometer resistance is 90Ω and the shunt resistance has a value of 10Ω. If there are 50 divisions in the galvanometer-turned ammeter on either sides of zero, its current sensitivity is

1. 1 × 105 A/div
2. 2 × 104 A/div
3. **1 × 105 div/A**
4. 2 × 104 div/A

I. The true length of a wire is 3.678 cm. When the length of this wire is measured using instrument A, the length of the wire is 3.5 cm. When the length of the wire is measured using instrument B, it is found to have a length of 3.38 cm. Then the

1. **Measurement with A is more accurate while measurement with B is more precise.**
2. Measurement with B is more accurate and precise.
3. Measurement with A is more precise while measurement with B is more accurate.
4. Measurement with A is more accurate and precise.

J. A nucleus with mass number 220 initially at rest emits an alpha particle. If the Q value of the reaction is 5.5 MeV, calculate the value of kinetic energy of the alpha particle.

1. **5.4 MeV**
2. 7.4 MeV
3. 4.5 MeV
4. 6.5 MeV