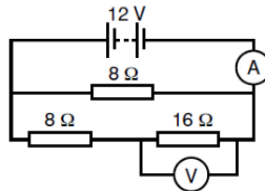


- Which one of the following is NOT the characteristic of a simple harmonic motion?
  - Acceleration is directly proportional but opposite to the displacement.
  - Maximum kinetic energy is observed at turning positions.
  - Period and frequency are independent of the amplitude.
  - Amplitude of the motion remains constant.
- An object of mass 2g is thrown vertically with 40 m/s. The object reaches the maximum height after 4 seconds. What is the velocity of the object at this height?
  - 38 m/s
  - 40 m/s
  - 30 m/s
  - 52 m/s

- For the electric circuit shown below, if the ammeter and cell have negligible internal resistances and the voltmeter has an infinite resistance, the reading in the ammeter will be

- 2A
- 4A
- 12A
- 1A



- A particle of 0.1kg mass rotates at a constant rate of 2 rad/s in a circular path. If the moment of inertia of the particle is 2.5kgm<sup>2</sup>, what will be the radius of the path?
  - 5m
  - 50m
  - 0.25m
  - None of these.
- The torque on a loop of wire of area 1 cm<sup>2</sup> at 37° to a magnetic field of strength 50 mT with current of 2.0A flowing through it is
  - 8μ N·m
  - 6μ N·m
  - 10μ N·m
  - 0.6μ N·m
- What is the period of a 40 cm simple pendulum performing simple harmonic motion on the surface of the Earth?
  - π sec
  - 0.4π sec
  - 0.5π sec
  - 0.2π sec
- A 2kg block tied to one end of a spring of spring constant 5 N/kg is performing simple harmonic motion along a horizontal smooth surface. If the amplitude of the motion is 2cm, at what position from its equilibrium position will the block have a speed half of its maximum speed?
  - √2 cm
  - 2 cm
  - √3 cm
  - 1cm
- Materials with unpaired electrons which align themselves in the same direction as an applied magnetic field so that they are parallel to each other are known as
  - ferromagnetic.
  - diamagnetic.
  - paramagnetic.
  - lodestone.

9. An imaginary line joining points of a travelling wave that are in phase is known as
- amplitude.
  - wave front.
  - wavelets.
  - wave length.
10. A person moved a 2kg box at a constant speed on a rough horizontal surface by applying  $\frac{1}{\sqrt{2}}$ N force at an angle of  $45^\circ$  from the horizontal. What are the values of the friction force and the normal force respectively?
- $\sqrt{2}$  N, 19.5N
  - 0.5N, 20.5N
  - 5N, 14.5N
  - $\sqrt{2}$  N, 20N
11. In an RLC circuit that has an AC power supply of 12V at 50Hz are connected in series with a capacitive reactance  $4\Omega$ . What is the impedance of this circuit?
- $2\Omega$
  - $22\Omega$
  - $5\Omega$
  - $10\Omega$
12. Newton's second law of motion states that,
- the rate of change of velocity of an object is directly proportional to net force on it.
  - the net force on an object is inversely proportional to the acceleration.
  - the velocity of an object is directly proportional to the net force on it.
  - any force exerted on an object is directly proportional to its acceleration.
13. Which one of the following statements is not correct?
- The complete conversion of energy from a hot source into work is impossible.
  - The total entropy of a system never decreases for any process.
  - Equal volumes of all gases contain the same number of molecules at all conditions.
  - Internal energy remains constant for an isothermal process.
14. Which one of the following is false about photons?
- They have the properties of waves.
  - They have the property of being indivisible.
  - Their energy is inversely proportional to their wave frequency.
  - They have no mass and electric charge.
15. A wheel with moment of inertia  $30 \text{ kg}\cdot\text{m}^2$  is rotating with an acceleration of  $20 \text{ rad/s}^2$ . The torque exerted on the wheel is
- $600 \text{ N}\cdot\text{m}$
  - $1.5 \text{ N}\cdot\text{m}$
  - $50 \text{ N}\cdot\text{m}$
  - $6000 \text{ N}\cdot\text{m}$
16. The emf of a battery equals the terminal potential
- for an ideal battery.
  - always.
  - when there is current flow through the battery.
  - in the absence of friction.
17. A screen is placed 40cm away from the center of a double-slit, which is illuminated with light of wave length 600nm. If the distance between the first and third order dark fringes is 3mm, what is the distance between the slits?
- $160 \mu\text{m}$