# PHYSICS TEST

Section A

1. Light refracts when traveling from air into glass because light;

   a) travels at the same speed in air and in glass
   b) frequency is greater in air than in glass
   c) frequency is greater in glass than in air
   d) travels slower in glass than in air

2. A man is applying 3N force on a block of mass 12 kg. Then the block's acceleration will be

   a) 25 m/s^2
   b) 0.50 m/s^2
   c) 4 m/s^2
   d) 0.25 m/s^2

3. A book is kept on a dashboard of a car that's stopped at a traffic light. As the car starts to move forward, the book slides off the dashboard. Pick the most correct explanation.

   a) There was grease on the dashboard
   b) The book had inertia
   c) A supernatural force took over
   d) Air resistance made the book move backward.

4. A positively charged sphere A is brought close without touching to a neutral conducting sphere B. Sphere B is touched with a grounded wire. What is the charge on sphere B after the wire is removed?
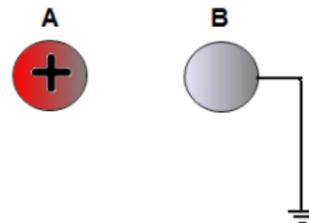
   a) Positive
   b) Negative
   c) It stays neutral
   d) It depends on the contact time

5. According to Lenz's law the direction of an induced current in a conductor will be that which tends to produce which of the following effects?

   a) enhance the effect which produces it
   b) oppose the effect which produces it
   c) produce a greater heating effect
   d) produce the greatest magnetic field

6. Which of the following statements is false?

   a) −30∘C is equivalent to 243 K
   b) Convection only occurs in liquids and gases
   c) Conduction and convection cannot occur in a vacuum
   d) Radiation is absorbed by a silver surface

7. The function of the electric motor is which one of the following conversion processes?

   a) mechanical energy to electrical
   b) alternating current to direct
   c) electrical energy to mechanical
   d) direct current to alternating

8. Identify the statement which is not true among the statements given below:

   a) number of molecules in a mole is called Avogadro's number
   b) Planck's constant is a universal constant which relates frequency and energy of light
   c) sound waves can never travel without a medium
   d) electrons reside inside the nucleus of an atom

9. Pick out the scalar quantity among the below given physical quantities:

   a) displacement
   b) force
   c) linear momentum
   d) work

10. A body starting from rest attains a speed of 25 m/s in 5 seconds in a one dimensional motion. What is its acceleration?

   a) 5 m/s^2
   b) 10 m/s^2
   c) 15 m/s^2
   d) 1 m/s^2

Section B

1. 9 kg of gold at a temperature of 40°C is placed into contact with 1 kg of copper at a temperature of 80°C. The specific heat of gold is 130 J/kg°C and the specific heat of copper is 390 J/kg°C. At what temperature do the two substances reach thermal equilibrium?

2. One gallon of paint (volume = 3.78×10^{-3} m³) covers an area of 25.0 m². What is the thickness of the paint on the wall?

3. A body of mass **m** moving with velocity **u** collides with a stationary body of mass 2**m**. Both of them stick together and move. Then the speed of the system after collision, is

4. A skydiver falling freely under the force of gravity has an initial velocity of 18 m/s. How long will it take him to fall 50 m. Neglect air resistance and take the acceleration due to gravity to be 9.8 m/s²?

5. An object 25 cm away from a lens produces a focused image on a film 15 cm away. What is the focal length of the converging lens? $[\ Equation:\ \frac{1}{f} = \frac{1}{u} + \frac{1}{v}]$

6. Two capacitors, 6 µF and 6 µF, are connected in series across a 12 V battery. (a) Find the equivalent capacitance of the two capacitors. (b) Find the charge stored in each capacitor?

7. Two positively charged particles are initially held at a fixed distance apart. How far you should move them farther apart so that the magnitude of their mutual electrostatic force reduces to: 1/4th of initial force?

$$[Equation: F = k\frac{q_1 q_2}{r^2}]$$

8. The current in a single loop circuit where a power supply $V_{P.S}$ is connected to one resistor of resistance R is 5.0 A. When an additional resistance of 8.0 Ω is inserted in series with R, the current drops to 3.0 A. Find the resistance of the resistor R?