ENGINEERING PHYSICS

(Theory : 2 (A))

Full Marks : 80   *Time* : 3 hours

Answer any **five** questions including **Q.Nos.1 & 2**

Figures in the right-hand margin indicate marks

1. Answer *all* questions :   2 × 10

   (*a*) State the Principle of Homogeneity.

   (*b*) Define Universal Gravitational Constant (G).

   (*c*) State Triangle law of vector addition.

   (*d*) State two properties of Ultrasonic.

   (*e*) State the Laws of Refraction.

   (*f*) Define Unit Charge.

   (*g*) Define Joule's Mechanical Equivalent of Heat.

   (*h*) State Ohm's Law.

   (*i*) Mention the properties of LASER.

   (*j*) State Lenz's Law.

2. Answer any *six* questions :   5 × 6

   (*a*) Check the correctness of the relation dimensionally : $F = 2mv^2/r$.

   (*b*) Establish the relation between (*i*) Linear and Angular Velocity (*ii*) Linear and Angular Acceleration.

   (*c*) Distinguish between Transverse wave and Longitudinal wave.

   (*d*) State Kepler's Laws of Planetary Motion.

   (*e*) State the Laws of Limiting Friction.

   (*f*) Define Specific Heat. Find its unit and dimension.

   (*g*) State Coulomb's Laws in Magnetism.

   (*h*) Find the total capacity when three capacitors of capacity, $2\mu F$, $3\mu F$ and $5\ \mu F$ are connected in series.

3. Derive expression for displacement, velocity and acceleration of a particle executing. Simple Harmonic Motion.   10

4. State Kirchhoff's Laws and obtain Balanced condition of Wheatstone's Bridge.   4 + 6

5. Define the coefficients of Linear, Superficial and cubical Expansion of solids and Establish the relation $\alpha : \beta : \gamma :: 1 : 2 : 3$.   4 + 6

6. State Faraday's Laws of Electromagnetic Induction. Calculate the equivalent resistance of 5 resistors of 5Ω each connected in parallel.   6 + 4

7. Write short notes on any *two* : 5×2

    (*i*) Total Internal Reflection

    (*ii*) Properties of Magnetic Lines of Force

    (*iii*) Relation between wave parameters

    (*iv*) Fleming's Left Hand Rule.

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