

## ENGINEERING PHYSICS

(Code : BST-101)

Full Marks : 80

Time : 3 hours

Answer any **five** questions including **Q. Nos. 1 and 2***Figures in the right-hand margin indicate marks*

1. Answer *all* questions : 2 × 10
- (a) Write down the units of the following physical quantities :
- (i) Potential Energy
  - (ii) Frequency
  - (iii) Pressure
  - (iv) Momentum
- (b) Given,  $\vec{A} = 2\hat{i} + 3\hat{j} - 5\hat{k}$ ,  $\vec{B} = \hat{i} - 2\hat{j} + \hat{k}$ , Find  $\vec{A} \cdot \vec{B}$
- (c) What is the condition for maximum range of projectile ?
- (d) What is the relation between linear velocity and angular velocity ?
- (e) Write down the application of Optical Fibre.
- (f) Define Unit Charge.
- (g) State the First Law of Thermodynamics.
- (h) State Ohm's law.
- (i) Write down properties of LASER.
- (j) Calculate the magnetic flux density at the centre of a circular coil of radius 5 m, when a current of 2 A flows through it.
2. Answer any *six* questions : 5 × 6
- (a) A car starting from rest attains a velocity of 60 m/sec in 2 minutes. Calculate the acceleration.
- (b) Derive expression for velocity and acceleration of a particle executing SHM.
- (c) Distinguish between progressive wave and stationary wave.
- (d) Calculate the equivalent capacitance between 3 capacitors of capacity 5  $\mu\text{F}$ , 10  $\mu\text{F}$  and 0.2 mF connected in parallel.
- (e) State and explain Fleming's Left Hand Rule.
- (f) Establish the relation,  $\beta = 2\alpha$ .
- (g) State Coulomb's laws in Magnetism.
- (h) State the laws of Photoelectric Emission.

( 2 )

3. State Newton's laws of Gravitation. Define Gravitational Constant  $G$  and establish a relation between  $g$  and  $G$ . 6 + 4
  4. State the laws of Limiting Friction and mention some methods to reduce friction. 6 + 4
  5. Define Critical Angle and Total Internal Reflection with diagram. Establish the relation between refractive index and critical angle. 6 + 4
  6. State Kirchhoff's laws and obtain balanced condition of Wheatstone's Bridge. 6 + 4
  7. State and explain Faraday's laws of Electromagnetic Induction. 10
-