1ST SEMESTER/ COMMON TO ALL BRANCHES/ 2020(W)NEW
TH-2A ENGINEERING PHYSICS

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
   a. Name the basic units in S.I system.
   b. Define dot product of 02 vectors.
   c. What is Dynamic friction?
   d. Mention the relationship between (i) Linear & Angular velocity (ii) Linear & Angular acceleration
   e. Define Universal Gravitational Constant (G).
   f. How are velocity, frequency and time period of a wave related ?
   g. Define Specific Heat of a substance.
   h. What is Refractive Index? State its unit.
   i. Define Unit Charge.
   j. What does LASER stand for?

2. Answer **Any Six** Questions 5 x 6
   a. Check the dimensional correctness of the physical relations
   (i) $s = 6ut + 8at^2$ (ii) $v^2-u^2 = 9as$ (2.5+2.5)
   b. At what angle 02 forces (A+B) and (A-B) should be inclined to have a resultant $\sqrt{3A^2 + B^2}$
   c. What are different methods of reducing friction ?
   d. Explain the variation of acceleration due to gravity (g) with
   (i) Altitude (ii) Depth (2.5+2.5)
   e. Explain “Critical Angle” and “Total Internal reflection” with ray diagram
   f. The effective capacitance of 02 capacitors is 4 µF when connected in series and 18 µF when connected in parallel. Find the capacitance of each capacitor.
   g. State & explain Coulomb’s Law in Magnetism. (2 + 3)

ANSWER ANY THREE QUESTIONS 10 x 3

3 Derive formulae for (i) Time of flight (T) (ii) Maximum Height attained (iii) Maximum Horizontal Range of a projectile fired at an angle θ with horizontal. (3+4+3) 10

4 Obtain equations for (i) Displacement (ii) Velocity (iii) Acceleration of a body executing Simple Harmonic Motion (SHM) (3+4+3) 10

5 Prove that $\alpha : \beta : \gamma = 1 : 2 : 3$ where $\alpha, \beta \; and \; \gamma$ are co-efficients of linear, areal and cubical expansion of solid material. 10

6 Establish the condition of balance in a wheatstone bridge using Kirchoff’s law with a clear circuit diagram. 10

7 State Faraday’s laws of electromagnetic induction. Compare Fleming’s Left Hand Rule and Right Hand Rule. (5+5) 10