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II—Sem/COMMON/2019(S)(New)

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) Write down the dimensional formula of the following physical quantities :

(i) Power

(ii) Frequency

(b) Given, $\vec{A} = \hat{i} - 2\hat{j} - 3\hat{k}$, $\vec{B} = 2\hat{i} + \hat{j} - 5\hat{k}$, Find $\vec{A} \cdot \vec{B}$.

(c) State Triangle law of vector addition.

(d) Define Latent Heat of Vaporization.

(e) Draw a ray diagram for refraction through a prism.

(f) Define Unit Pole.

(g) State the First Law of Thermodynamics.

(h) State Kirchhoff's 2nd Law.

(i) Write down two important applications of LASERS in Industry.

(j) State Fleming's Left Hand Rule.

2. Answer any six questions :

5 × 6

(a) Two forces whose magnitudes are in the ratio 3 : 5 give a resultant equal to 70 N. If the angle between them is 60°, find the magnitude of each force.

(b) A car attains a velocity of 50 m/sec in 5 minutes from standstill. Calculate the acceleration.

(c) Distinguish between mass and weight.

(d) State Newton's Laws of Gravitation and define G .

(e) Write different methods to reduce Friction.

(f) Establish the relation between α and β .

(g) State Coulomb's Laws in magnetism.

(h) State Faraday's Laws of Electromagnetic Induction.

3. Derive expressions for time of flight, maximum height and range of a projectile fired at an angle θ with the horizontal.

10

(Turn Over)

(2)

4. Calculate the amount of heat required to convert 5 gm of ice at -5°C to water at 60°C . Given, specific Heat of Ice = $0.5 \text{ Cal/gm } ^{\circ}\text{C}$, Latent Heat of ice = 80 Cal/gm . 10
5. Define Critical Angle and Total Internal Reflection with diagram. Write down the principle and application of Optical Fibre. 6 + 4
6. State Coulomb's Laws of Electrostatics. Find out the equivalent resistance of 5 Resistors of which 2Ω , 3Ω and 5Ω connected in series and 10Ω and 20Ω are connected in parallel to them. <http://www.sctevtonline.com> 5 + 5
7. Derive an expression for force acting on a current carrying conductor placed in a uniform magnetic field. Compare between Fleming's Left Hand Rule and Right Hand Rule. 6 + 4

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