Hall Ticket No		Question Paper Code: AHS007
	UTE OF AERONAUTICAL ENG (Autonomous)	INEERING
OW FOR LIVE	MODEL QUESTION PAPER – II	
Four Y	Vear B.Tech I Semester End Examinations, Dece Regulation: R16 APPLIED PHYSICS (Common to AE, ME and CE)	mber – 2016
Time: 3 Hours		Max Marks: 70
Answer any ONE question from each Unit		

#### Answer any ONE question from each Unit All questions carry equal marks All parts of the question must be answered in one place only

## Unit - I

- 1. (a) How is dielectric constant related with permeability of substances and capacity of capacitors. [3M]
  - (b) Define ionic polarizability. On what factors the ionic polarizability depends? Derive an expression for the ionic polarizability. [7M]
  - (c) The dielectric constant of He gas is 1.0000684. Find the electronic polarizability of He atoms if the gas contains  $2.7 \times 1025 atoms/m^3$ . [4M]
- 2. (a) Obtain a relation between Magnetic induction 'B' Magnetic susceptibility ' $\chi$ ' and Magnetic field intensity. [3M]
  - (b) Explain the origin of magnetic moment. Find the magnetic dipole moments due to orbital and spin motions of an electron. [7M]
  - (c) Find relative permeability, if  $H = 220 \ amp/m$  and M=3300 amp/m. [4M]

# Unit - II

- 3. (a) Mention the relation between reverberation time 'T', absorption coefficient 'a' and surface area 's'. [3M]
  - (b) Discuss the factors which are affecting the architectural acoustics and suggest your remedy. [7M]
  - (c) The volume of a hall is 475  $m^3$ . The area of the wall is 200  $m^2$ , area of floor and ceiling each is 100  $m^2$ . If the absorption coefficient of the wall, ceiling and floor are 0.025, 0.02 and 0.55 respectively, calculate the reverberation time for the hall. [4M]
- 4. (a) Write the properties of ultrasonic waves.
  - (b) Describe the piezo-electric method for production of ultrasonic waves. [7M]
  - (c) Calculate the velocity of ultrasonic wave of  $Y = 7.9 \times 10^{10} N/m2 \rho = 2650 Kg/m^3$ . [4M]

## Unit - III

5. (a) Explain the condition for equilibrium of concurrent forces in a plane. [3M] (b) Explain the parallelogram law of forces. [7M]

[3M]

- (c) Determine horizontal force P to be applied on the block of weight 1500N to hold it in fixed position on a smooth inclined plane AB of angle angle 30<sup>0</sup> with the horizontal [4M]
- 6. (a) State and explain Varignon's theorem with an example. [3M]
  - (b) A force of 100N is applied at the top end of a rod AB, placed at  $60^{\circ}$  with the horizontal. Find the momentum about bottom end A of the rod. [7M]
  - (c) A force of 100N is applied at the top end of a rod AB, placed at 60<sup>0</sup> with the horizontal. Find the momentum about bottom end A of the rod. [4M]

#### $\mathbf{Unit} - \mathbf{IV}$

- 7. (a) How are static, dynamic and rolling frictions are different and which one has a maximum and minimum value in magnitude? [3M]
  - (b) Give examples to show that friction is both friend and foe. [7M]
  - (c) A ladder 7 m long rests against a wall, making  $45^0$  with the ground. A man of weight, half of weight of ladder climbs it. At what distance along the ladder will he be, when the ladder is about to slip? Given the coefficient of friction between the ladder and the wall is 1/3 and the ladder and floor is 1/2. [4M]
- 8. (a) What is limiting friction?
  - (b) Describe the cause of friction.
  - (c) A man weighing 75N stands in the middle of a ladder AB of 25N weight resting on smooth floor at A. The base of the ladder is 2 m away from the wall and the top of the ladder B touches the wall at a height 4m from the ground. The ladder is prevented from slipping by a string OD which makes an angle  $30^0$  with horizontal, at the bottom of the wall. The string OD is perpendicular to the ladder. Find the tension in the string. [4M]

## $\mathbf{Unit}-\mathbf{IV}$

- 9. (a) State perpendicular and parallel axis theorem. [3M]
  (b) Derive a relation for moment of inertia of a circular disc (i) along the diagonal (ii) along the perpendicular passing through the centroid [7M]
  (c) Determine MI of about diameter of circular disc of mass 500 g and radius 8 cm [4M]
  10. (a) Explain radius of gyration. What is its physical significance? [3M]
  (b) Calculate the moment of inertia of a rectangular lamina of length 'L', breadth 'b' and mass 'm'
  - (b) Calculate the moment of inertia of a rectangular lamina of length 'L', breadth 'b' and mass 'm' about an axis passing through centroid (i) from the centroid perpendicular to lamina (ii) at one of the vertex perpendicular to lamina. [7M]
  - (c) A thin metal rod mass 40 g is suspended. Calculate the moment of inertia of the rod. [4M]

[3M]

[7M]