Hall Ticket No | | | | | | | | | | |

Question Paper Code: AHS007

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech I Semester End Examinations (Supplementary) - February, 2017

Regulation: IARE–R16

APPLIED PHYSICS

(Common to AE|CE|ME)

Time: 3 Hours **Max Marks: 70**

Answer 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) What are ferromagnetic materials? Discuss the hysteresis of a ferromagnetic material. **[7M]**

(b) What are the classification and properties of magnetic materials? **[7M]**

2. (a) Explain the different types of magnetic materials. **[7M]**

(b) An empty solenoid having a current of 1A produces a magnetic field of 0.25 T at a point along the axis outside the solenoid. If a specimen is now introduced inside the solenoid then the magnetic field at the same point on the axis of the solenoid is 25 T. What is the susceptibilty of the specimen? **[7M]**

UNIT – II

3. (a) Explain the meaning of (i) reverberation and (ii) reverberation time. **[7M]**

(b) What is coefficient of absorption? Explain the experimental determination of the absorption coefficient of a material. **[7M]**

4. (a) Explain in the application of ultrasonic waves in science, medicine and industry. **[7M]**

(b) What is SONAR? Explain how ultrasonic waves are used in SONAR. **[7M]**

UNIT – III

5. (a) A rigid body is pulled by three coplanar forces such that the body is static. What can be concluded about the forces and draw a free body diagram for the body and explain. **[7M]**

(b) Two concurrent coplanar forces A and B make a certain angle with each other. If the resultant R makes an angle α with A and β with B then derive a relation for A and B in terms of R , α and β. **[7M]**

6. (a) What is resultant of a force system explain determination of resultant of two concurrent forces in case of parallelogram law of forces and law of triangle of forces. **[7M]**

(b) Distinguish between the terms equilibrium and rest. Explain the conditions of equilibrium of coplanar forces system. **[7M]**

UNIT – IV

7. (a) What is friction explain the importance and nature of friction. **[7M]**

(b) Explain the coefficient friction.What are the applications of friction? **[7M]**

8. (a) Give 4 examples to show that friction leads to lesser efficiency. A 1000 kg boat is travelling at 90 kmph when its engine is shut off. The magnitude of the frictional force between the boat and the water is given by f_k = 70v where v is the speed of the boat. Find the time required for the boat to slow to 45 kmph. **[7M]**

(b) Explain cone of friction force in detail. **[7M]**

UNIT – V

9. (a) State parallel axis theorem. If the moment of inertia of a circular disc about an axis passing through a diameter is $MR^2/4$, what is the moment of inertia about a tangent to the disc parallel to its plane? **[7M]**

(b) Derive an expression for the moment of inertia about an axis passing through the centre of mass of a rectangular plate, the axis being perpendicular to the plane of the plate. **[7M]**

10. (a) The radius of gyration changes with the axis of rotation of a body. Explain . **[7M]**

(b) Derive an expression for the moment of inertia of a rectangular plate perpendicular to its length and passing through one end parallel to the plane of the plate. **[7M]**