**Reg. No. \_\_\_\_\_\_\_\_**

**Karunya University**

**(Karunya Institute of Technology and Sciences)**

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination - June 2011**

**Subject Title: ENGINEERING PHYSICS Time: 3 hours**

**Subject Code: 10PH201 Maximum Marks: 100**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. \_\_\_\_\_\_\_\_\_\_ is the SI unit of force.

2. \_\_\_\_\_\_\_\_\_\_is the SI unit of mass.

3. \_\_\_\_\_\_\_\_\_\_ is defined as the quantity of heat required to raise the temperature of unit mass of a substance through one degree.

4. If W is the amount of work that disappears a definite quantity of heat H, and then mechanical equivalent of heat J is equal to \_\_\_\_\_\_\_\_\_\_.

5. If ф is the magnetic flux linked with area A, then magnetic induction B at a point is given by \_\_\_\_\_\_\_\_\_\_.

6. The magnetic susceptibility of a diamagnetic material is \_\_\_\_\_\_\_\_\_\_.

7. The work done to bring a unit positive charge from infinity to that point is called \_\_\_\_\_\_\_\_\_\_.

8. The potential at all points inside a charged hollow sphere is constant being \_\_\_\_\_\_\_\_\_\_ to that on the surface of the sphere.

9. The law governing the direction of the induced e.m.f. is \_\_\_\_\_\_\_\_\_\_.

10. The \_\_\_\_\_\_\_\_\_\_ is an electrical device based on the principle of mutual induction between two cells.

**PART – B (5 x 3 = 15 MARKS)**

11. State Newton’s First and second laws of motion.

12. State and explain third law of thermodynamics.

13. State and explain tangent law.

14. Define electric field strength. Mention some properties of electric lines of force.

15. The mutual inductance between the primary and secondary of an inductance coil is 5 Henrys and a current of 5 amperes in the primary coil is cut-off entirely in 0.001 of a second. Calculate the induced e.m.f. between the remains of the secondary coil.

**PART – C (5 x 15 = 75 MARKS)**

16. a. State and explain Newton’s Third law of motion. (2)

b. A smooth sphere of mass 4 Kg moving with a velocity of 10ms-1 impinges directly on smooth sphere of mass 5 Kg moving with a velocity of 5ms-1 in the opposite direction. Find the velocities of the sphere after impact. (e=1/2). [Given the formula v1 – v2 = 1/e (u1-u2), by the Newton’s experimental law, for relative velocity between the spheres along the common normal after impact is equal to e times the relative velocity between them in the same direction but opposite direction. (13)

(OR)

17. a. Give the static procedure for measuring forces. (2)

b. Forces equal to 7P, 8P and 5P acting on a particle are in equilibrium. By drawing, calculate the angle between the forces 8P and 5P. (13)

[P.T.O]

18. a. Define specific heat at constant volume Cv  and specific hat at constant pressure Cp (2)

b. Calculate the specific heat of air at constant volume, given the specific heat at constant pressure is 0.23, density of air at N.T.P 1.293 gram/litre and J =4.2 x 107 ergs/cal. (13)

(OR)

19. a. State the second law of thermodynamics. (2)

b. State Carnot theorem. Prove that the efficiency of a Carnot engine using an ideal gas as a working substance (reversible) is η= T1-T2/T1 (13)

20. a. Define the term magnetic susceptibility. (2)

b. Explain the graphical representation between (i)I-H (ii) B-H of a magnetic material subjected to the action of a magnetizing field. (13)

(OR)

21. a. Give the magnetic properties of ferromagnetic materials. (2)

b. Explain Stern and Gerlach experiment to measure the magnetic moment. (13)

22. a. State Gauss theorem in Electrostatics. (2)

b. Explain any one application of Gauss theorem. (13)

(OR)

23. a. Calculate the electric potential energy of a electron-proton system of a atom. The radius of the orbit of the electron is 21.16 x 10-11 m. The charge on the electron is 1.6 x 10-19 C.(2)

b. Derive an expression for electrostatic potential at a point due to a dipole. (13)

24. a. State Fleming Right Hand Rule. (2)

b. State the laws of electromagnetic induction. Express it mathematically. (13)

(OR)

25. a. Calculate the back e.m.f. induced in a coil of 5mH in which a current of 1amp. Is established in 1/100 of a second. (2)

b. Describe the construction and working of earth’s inductor. How it is used to find the angle of dip at a place. (13)