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Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2010

EE 04 506—ELECTRICAL ENGINEERING MATERIAL SCIENCE

Time : Three Hours Maximum : 100 Marks

I. (a) What are the various meterials used for brushes of electrical machines, lamp filaments, fuses and solders.

(b) Explain Curie-Weiss law.

(c) Explain Dipolar relaxation.

(d) What is hysteresis loss ? Explain how it effects the selection of magnetic materials for electrical machines.

(e) Discuss the properties of mica as a dielectric.

(f) What are the various factors influencing dielectric strength ?

(g) Explain Ferromagnetic Resonance.

(h) Explain Photothermal conversion.

(8 × 5 = 40 marks)

II. (a) (i) Write short notes on Fermi-Diac distribution and contact potential. (8 marks)

(ii) Explain amorphous and organic semiconductors. (7 marks)

Or

(b) State Curie-Weiss law. Explain metallic conduction based on free-electron theory. (15 marks)

III. (a) Derive an expression for polorization in solids and liquids. (15 marks)

Or

(b) Derive an expression for electronic, ionic, dipolar polarization in polyatomic gases. (15 marks)

IV. (a) (i) Explain the various factors influencing dielectric strength. (8 marks)

(ii) Explain the mechanism of breakdown in gases. (7 marks)

Or

(b) Discuss the various gaseous insulators with a neat diagram. (15 marks)

Turn over

V. (a) Write short notes on Heat and cold mirror coating. (15 marks)

Or

(b) Explain in detail the magnetic and electron spin resonance. (15 marks)

[4 × 15 = 60 marks]