

**THIRD SEMESTER B.TECH. (ENGINEERING)
DEGREE EXAMINATION, JUNE 2008**

CE 04 306 – ELECTRICAL AND ELECTRONICS ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

- I. (a) A coil of fixed inductance 4.0 H and effective resistance 30Ω is suddenly connected to a 100 V, d.c. supply. What is the rate of energy storage in the field of the coil at each of the following instants (i) when the current is 1.0 A (ii) when the current is 2.0 A (iii) when the current is at its final steady value?
- (b) If a six pole induction motor supplied from a three phase 50 Hz supply has a rotor frequency of 2.3 Hz; Calculate (i) the percentage slip (ii) the speed of the rotor in revolutions per minute.
- (c) Give an account of the various wiring materials used.
- (d) What is the necessity of earthing in domestic wiring?
- (e) Explain the relationship between h_{fe} and a suitable device characteristic.
- (f) Design a D/A converter which will convert a six-bit binary number to a proportional output voltage.
- (g) Describe the methods for measurement of flow using (i) Venturimeters and (ii) Orifice plates.
- (h) Describe the basic components of a magnetic tape recorder for instrumentation applications using direct recording techniques.

(8 × 5 = 40 marks)

- II. (a) (i) Two impedances $14 + j5$ ohms and $18 + j10$ ohms are connected in parallel across a 200 V, 50 Hz supply. Determine (1) the admittance of each branch and of the entire circuit (2) the total current, power and power factor and (3) the capacitance which when connected in parallel with the original circuit will make the resultant power factor unity.
- (ii) Calculate the admittance $G + jB$ if the impedance is $6 + j8$ ohms.

(10 + 5 = 15 marks)

Or

- (b) (i) Explain the principle of operation of a transformer. What are its applications?
- (ii) What is the principle of a rotor resistance starter?

(9 + 6 = 15 marks)

- III. (a) Draw a neat wiring diagram for staircase lighting and explain its working.

Or

- (b) Explain about wiring materials and accessories.

(15 marks)

Turn over

- IV. (a) (i) List the applications of BJT.
(ii) Explain the mechanism of avalanche breakdown and zener breakdown.
(iii) Define α , β and γ of a transistor. Show how α and β are related to each other.
(5 + 5 + 5 = 15 marks)

Or

- (b) (i) Describe the action of a full wave bridge rectifier.
(ii) What are the advantages of a bridge rectifier?
(9 + 6 = 15 marks)

- V. (a) (i) Describe the following types of oscilloscopes.
(1) Dual trace type.
(2) Dual beam type.
(ii) Describe how the following measurements can be made with the use of a CRO.
(1) frequency.
(2) phase angle.
(iii) A Lissajus pattern on an oscilloscope is stationary and has 5 horizontal tangencies and 2 vertical tangencies. The frequency of horizontal input is 1000 Hz. Determine the frequency of vertical input.
(5 + 5 + 5 = 15 marks)

Or

- (b) Explain the construction of wire wound strain gauges and derive the expression for the gauge factor.
(15 marks)

[4 × 15 = 60 marks]