

Roll No.

BE-104(GS)

B. E. (First/Second Semester)

EXAMINATION, June, 2011

(Common for all Branches)

BASIC ELECTRICALS AND ELECTRONICS ENGINEERING

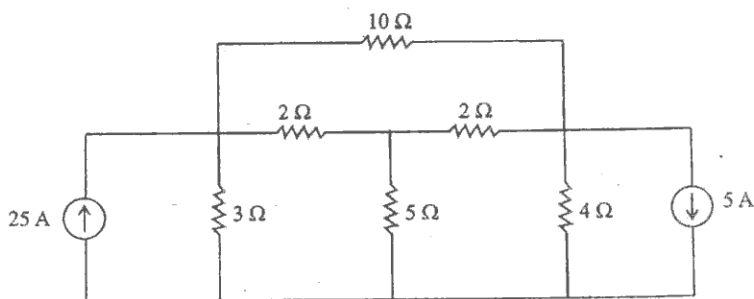
Time : Three Hours

Maximum Marks : 70

Minimum Pass Marks : 22 (D Grade)

Note : Attempt any five questions. Each question carries equal marks. Assume value of any missing data.

1. (a) State and explain superposition theorem with the help of example. 7
- (b) Using Nodal analysis method find currents in the various resistors of the network shown in fig. below. 7



Or

- (a) State and explain the Thevenin's theorem and find the V_{Th} and R_{Th} . 7

P. T. O.

(b) Define the following terms :

- (i) Active power
- (ii) Reactive power
- (iii) Apparent power
- (iv) Power factor

Then draw the power triangle and establish a relation among them.

2. Describe the construction, working principle types, then derive the induced e.m.f. equation of a transformer. Also draw the no-load phasor diagram and load phasor diagram (lagging).

14

Or

Describe the open circuit test and short circuit test with lab. diagrams to draw the equivalent circuit diagram and to determine the efficiency of the transformer in details.

14

3. Describe the construction, working principle and then derive the torque equation at standstill. Draw the torque-slip characteristics (3-mode) of three-phase induction motor.

14

Or

- (a) Discuss the construction, working principle of three-phase synchronous machines and derive expression of actual induced e.m.f. per phase. (for full-pitched coil).

7

- (b) Draw and explain the operating characteristics of D. C. motor and generator (with applications of each type).

7

4. (a) State and prove De Morgan's theorems for two variables.

Simplify :

$$f = (A + \overline{BC}) + \overline{(A + \overline{B} \cdot C)}$$

7

(b) Convert the following numbers : 1 each

(i) $(1276)_{10} = ()_8$

(ii) $(36 \cdot 125)_8 = ()_{10}$

(iii) $(327)_8 = ()_2$

(iv) $(FBA)_{16} = ()_2$

(v) $(17173)_8 = ()_{16}$

(vi) $(374 \cdot 37)_{10} = ()_{16}$

(vii) $(3AB)_{16} = ()_{10}$

Or

(a) Explain the following with circuit diagram, symbol and truth table :

(i) Full adder 5

(ii) NAND and EX-OR gates 2

(b) Describe the R-S-flip-flop using NAND gates with circuit diagram, truth table and waveforms. 7

5. (a) Draw and explain voltage-current characteristics of PN-junction. 7

(b) Draw and explain input and output characteristics of common emitter configurations. 7

Or

Describe the need of biasing circuit, then discuss in detail potential divider bias circuit. What are the advantages and disadvantages of this bias circuit over others ? 14