

**300111**

Dec., 2018

B.Tech. Ist Semester

**BASICS ELECTRICAL ENGINEERING****(ESC 101)**

Time : 3 Hours]

[Max. Marks : 75

*Instructions :*

- (i) *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
- (ii) *Answer any four questions from Part-B in detail.*
- (iii) *Different sub-parts of a question are to be attempted adjacent to each other.*
- (iv) *Any other specific instructions.*

**PART-A**

1. (a) Differentiate unilateral and bilateral network with suitable example. (1.5) CO1
- (b) What is the utility of superposition theorem? (1.5) CO1
- (c) Define Q factor. (1.5) CO1
- (d) Write the advantage of three phase system. (1.5) CO1
- (e) What do you mean by B-H curve? (1.5) CO1

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[P.T.O.]

- (f) What happens if the DC is applied to the transformer?  
(1.5) CO2
- (g) Name the method of speed control of DC motor.  
(1.5) CO2
- (h) Write the application of single phase induction motor.  
(1.5) CO2
- (i) Enumerate the control strategies used in chopper.  
(1.5) CO2
- (j) What is the purpose of fuse?  
(1.5) CO3

### PART-B

2. (a) Find the current in  $6\Omega$  using thevenin's theorem in Fig. 1  
(7) CO1

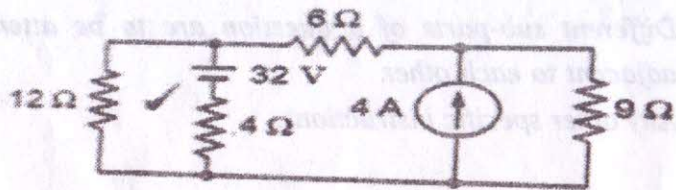


Fig.1

- (b) A step voltage applied to a series R-C circuit with  $R = 0.5\text{ M}\Omega$  and  $C = 8\text{ }\mu\text{F}$  is 200V. Determine  
(i) Time constant (ii) the initial charging current  
(iii) time taken for the p.d. across the capacitor to grow to 100V and (iv) the current and p.d. across the capacitor 4 second after application of step voltage.  
(8) CO1

3. (a) In a series parallel circuit, the parallel branches A and B are in series with branch C. the impedance of the branches are  $Z_A = (4 + j3)$ ,  $Z_B = \left(4 - \frac{j16}{3}\right)$ ,  $Z_C = (2 + j8)$ . If the current  $I_C = (25 + j0)$ , determine  
(i) Branch currents and voltages, (ii) total voltage and (iii) Draw the phasor diagram. (9) CO1
- (b) Discuss the classification of magnetic material on the basis of their magnetic properties. (6) CO1
4. (a) What is transformer? Explain its working principle. In what way a practical transformer is differ from an ideal transformer? Develop an equivalent circuit for the practical transformer. (10) CO2
- (b) Define resonance in RLC parallel circuit. Derive the expression for resonant frequency for the same. Also draw the resonance curve. (5) CO1
5. (a) Explain the construction and working of DC motor. (7) CO2
- (b) Explain the operation of three phase bridge inverter employing 180 degree mode of conduction. Draw the waveforms of phase voltage and line voltage assuming the resistive load is star connected. (8) CO2
6. (a) Define power converter. Describe the working of boost converter and derive the expression for output voltage. (6) CO2

- (b) Draw and explain the torque-slip characteristics of three phase induction motor. (4) CO2
- (c) Write the name of starting methods of three phase induction motor. Discuss any one. (5) CO2
7. (a) What is earthing? Why it is provided? Draw the neat sketch of pipe earthing. (5) CO3
- (b) What is MCB? Explain its function and working with neat diagram. (5) CO3
- (c) Describe the electrical characteristics of lead-acid batteries. (5) CO3