Roll No. ....

Total Pages : 4

300206

May 2019
B.Tech. IInd 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.*

## PART–A

1. (a) Differentiate dependent and independent sources with suitable example. (1.5) CO1

   (b) Explain the duality between Thevenin's and Norton's equivalent circuits. (1.5) CO1

   (c) Define power factor. (1.5) CO1

   (d) What do you mean by phase and phase difference? (1.5) CO1

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(e) Classify the losses in transformer. (1.5) CO2

(f) On what principle the synchronous generators operate? (1.5) CO2

(g) What is the function of commutator in DC machines? (1.5) CO2

(h) What is sinusoidal Pulse width modulation? (1.5) CO2

(i) In what form is energy is stored in secondary battery. (1.5) CO3

(j) What is the purpose of earthing? (1.5) CO3

PART-B

2. (a) Find the current through R_L resistance using Norton's Theorem in figure 1. When $R_L=16\Omega$. (7) CO1
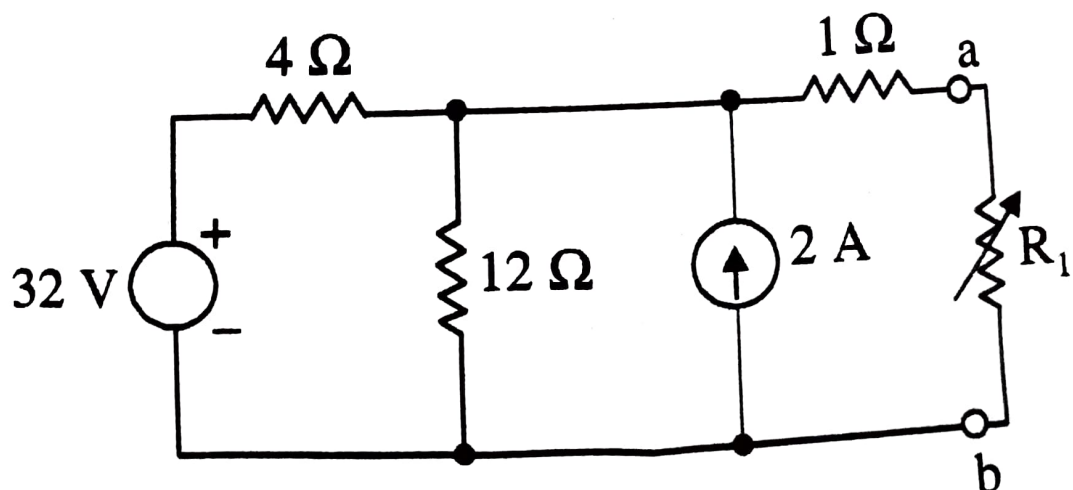
(b) Find the current in each branch by using superposition theorem in figure 2. (8) CO1

$$R_1 = 2\,\Omega$$

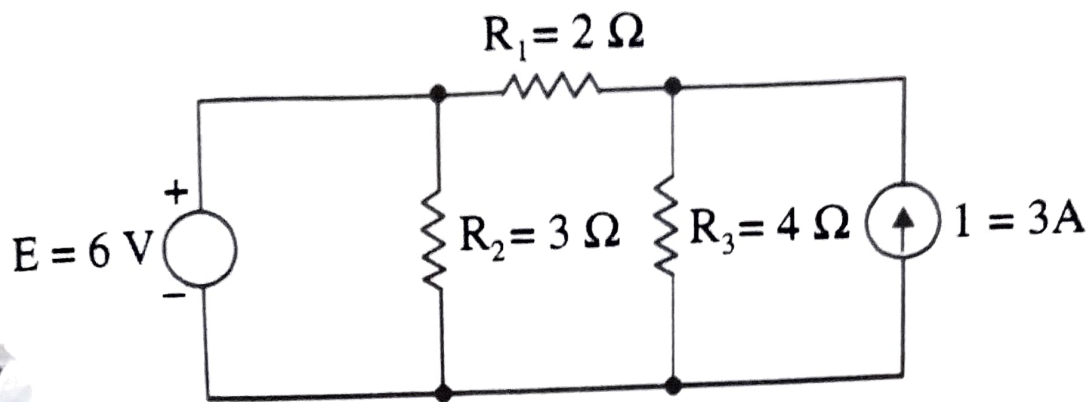$E = 6\,V$ $R_2 = 3\,\Omega$ $R_3 = 4\,\Omega$ $1 = 3A$

Figure 2

3. (a) Find the average value, rms value form factor and peak factor in case of half wave rectifier. (4) CO1

(b) A balanced delta connected load of $(12+j9)\Omega$ is connected to 3-phase 400 V supply. Find (i) Line current (ii) Power Factor (iii) Power drawn (iv) Reactive volt-amperes (v) Total volt-amperes. (5) CO1

(c) Explain working principle of autotransformer. What are its advantages, disadvantages and applications (6) CO2

4. (a) Derive the response of R-L-C series circuit with sinusoidal input. Also derive the condition for resonance for the same. (6) CO1

(b) Describe the working principle of transformer, and then derive the induced emf equation of a transformer. Define the efficiency and also draw the expression for maximum efficiency. (9) CO2

[P.T.O.

(a) Explain the construction and working of three phase induction motor. (7) CO2

(b) What is an inverter? Give the industrial application of inverters. Describe the working of single phase full bridge inverter with the help of voltage waveforms. (8) CO2

6. (a) Explain the working principle of power convert???? ?d discuss the control strategy for operation of converters. (7) CO2

(b) Explain the speed control methods of separately excited DC motor. (8) CO2

7. (a) Draw the circuit diagram of LT switchgear and explain each component in brief. (9) CO3

(b) Explain the operation of nickel-iron batteries and give its advantages and disadvantages. (6) CO3

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