

R18

Code No: 151AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, December – 2019/January - 2020

BASIC ELECTRICAL ENGINEERING

(Common to EEE, CSE, IT, ITE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- | | | |
|------|--|-----|
| 1.a) | What are the initial conditions? | [2] |
| b) | Define the RMS value. | [2] |
| c) | What are the ideal properties of transformer? | [2] |
| d) | Define synchronous speed. | [2] |
| e) | What are the merits of fuse? | [2] |
| f) | State the Thevenin's theorem. | [3] |
| g) | What are the merits of polyphase system? | [3] |
| h) | Draw the different 3-phase transformers connections. | [3] |
| i) | What is the purpose of dampers in a synchronous generator? | [3] |
| j) | What is the need of power factor improvement? | [3] |

PART – B

(50 Marks)

- 2.a) Explain the Kirchoff's current and voltage laws.
- b) For the circuit as shown in following figure 1, calculate the current in the various branches? (All resistances are in ohms). [5+5]

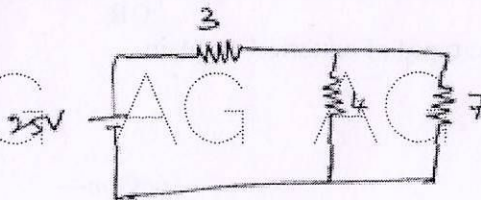


Figure: 1

OR

- 3.a) A Series R-L circuit is supplied by DC voltage. Determine the expression for $i(t)$ when the switch is closed at $t=0$.
- b) Using superposition theorem, find the current through the $8\ \Omega$ resistor, as shown in below figure 2. [5+5]

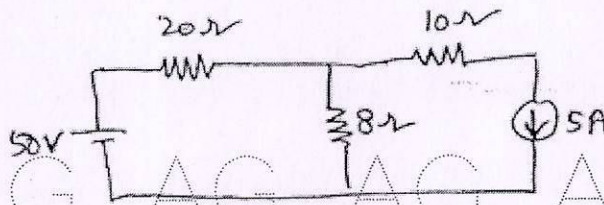


Figure: 2

4.a) Define the following terms:

- i) Frequency
- ii) Peak factor
- iii) Form factor
- iv) Average value of an alternating quantity.

b) A series RLC circuit consists of $R=3\ \text{ohm}$, $L=2\ \text{mH}$ and $C=0.4\ \mu\text{F}$. Determine the resonant frequency. [5+5]

OR

5.a) Derive the relation between line and phase quantities of voltage and current for a delta system.

b) Determine the line currents when a star connected balanced load with an impedance of $(15+j10)\ \text{ohms}$ is connected to 200V, three phase balanced supply in positive sequence. [5+5]

6.a) From the fundamentals, derive the expression for the EMF equation of a single phase transformer.

b) A 50 kVA, single phase transformer has 500 turns on the primary and 200 turns on the secondary. The primary is connected to 2000V, 50 Hz Supply. Determine: i) The secondary voltage and ii) The maximum value of flux. [5+5]

OR

7.a) What is a transformer? How does it transfer electrical energy from one circuit to another?

b) The primary and secondary voltage of an autotransformer are 500V and 400V respectively. Determine the economy in copper. [5+5]

8.a) Explain the principle of operation of 3-Phase induction Motor.

b) A 10-pole, 3-phase induction motor runs at a speed of 485 rpm at 50 Hz supply. Determine i) synchronous speed and ii) slip. [5+5]

OR

9. Explain the working principle of synchronous generator. [10]

10.a) How the cables/ wires are classified and list out.

b) What are the advantages of earthing? [5+5]

OR

11. What are the types of batteries? Explain. [10]

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