R18

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
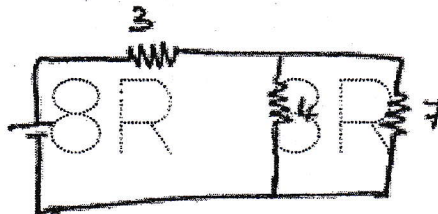branches? (All resistances are in ohms).   [5+5]

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 Ω resistor, as shown in below
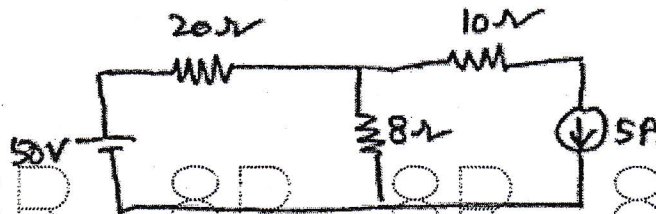figure 2.   [5+5]

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 ohm, L= 2mH and C=0.4 µF. 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) 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 suppl Determine i) synchronous speed and ii) slip.   [5+5]

OR

9. Explain the working principle of synchronous generator.

10.a) How the cables/ wires are classifies and list out.   [5+5
   b) What are the advantages of earthing?

OR   [10

11. What are the types of batteries? Explain.

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