

Code No: 123BR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, May/June - 2019

BASIC ELECTRICAL ENGINEERING

(Common to CSE, IT)

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.

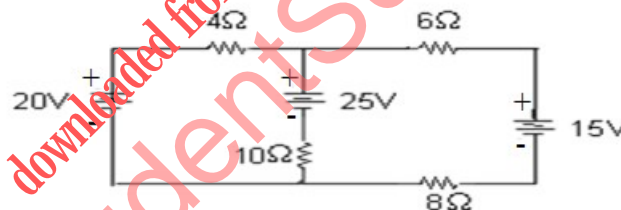
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) State and explain Ohms law. [2]
- b) State and explain Kirchhoff's laws. [3]
- c) What is meant by impedance? [2]
- d) Obtain the form factor of a sinusoidal voltage, $\mathcal{G} = V_m \sin \phi$. [3]
- e) Define efficiency of a Transformer. [2]
- f) What are the characteristics of an Ideal transformer? [3]
- g) Give the applications of 3- ϕ Induction motor. [2]
- h) Based on the type of excitation, classify the DC generators. [3]
- i) Compare spring control and gravity control methods. [2]
- j) What are the advantages and disadvantages of PMMC instrument? [3]

PART-B**(50 Marks)**

2. By applying Kirchhoff's laws, find the current through all the elements in the circuit as shown in the figure. [10]

**OR**

- 3.a) Write short notes on star-delta transformation. If R_{ab} , R_{bc} and R_{ca} are connected in delta, derive the expressions for equivalent star connection. [4+6]
- b) State Thevenin's theorem.
4. An a.c. circuit consists of a resistance of 5 ohms, an inductance of 0.1 H, and a capacitance of 100 μ F, all in series. Determine for this circuit:
 - a) Total Impedance
 - b) Reactance
 - c) Admittance
 - d) Susceptance, and
 - e) Conductance.
 The supply frequency is 60 Hz. [10]

OR

- 5.a) Write down the expression for the instantaneous power, and hence derive the equation for the average power.
- b) A series R-L-C circuit consists of 100 ohms resistor and an inductor of 0.318 Henry and a capacitor of unknown value. This circuit is supplied by 230V, 50HZ supply and draws a current of 2.3 amps, and the current is in phase with the supply voltage. Find the value of the capacitance, and the power supplied by the source. [5+5]
- 6.a) Draw the phasor diagram of Transformer under no load.
- b) A single phase transformer with a ratio of 440/110V takes a load current of 5A at 0.2 power factor lagging. If the secondary supplies a current of 120A at power factor of 0.8 lagging, estimate the current taken by the primary. [5+5]

OR

- 7.a) Derive the emf equation of a single phase Transformer.
- b) In 25KVA, 2000/200V, single phase Transformer, the iron and full-load copper losses are 50 W and 400 W respectively. Calculate the efficiency at unity power factor of:
- i) Full load and
- ii) Half full-load. [5+5]
- 8.a) Explain how the rotating magnetic field is developed in a 3- phase induction Motor.
- b) A 6 pole, 3-phase induction motor runs at 1140 rpm on full load when supplied power from a 60Hz supply. Determine the slip at full load. [6+4]

OR

- 9.a) Derive an expression for the speed of a DC motor in terms of back emf and flux per pole.
- b) A 4-pole lap wound D.C. shunt generator has a useful flux per pole of 0.06wb. The armature winding consists of 240 turns each of 0.0035 ohms resistance. Calculate the terminal voltage when running at 920 rpm, if the armature current is 60A. [5+5]
10. Explain the essential requirements of indicating instruments with necessary diagrams. [10]

OR

11. Explain with neat sketch the construction and working of a MI ammeter. [10]

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