

Roll No.

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Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (Automation & Robotics)/EE/ECE (Sem.–1,2)
Automobile Engg./BT/CE/CSE/Electrical & Electronics Engg./Electronics
& Electrical Engg./FT/IT/ME (2018 & Onwards)

BASIC ELECTRICAL ENGINEERING

Subject Code : BTEE-101-18

M.Code : 75339

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. **SECTION - B & C.** have FOUR questions each.
3. **Attempt any FIVE** questions from **SECTION B & C** carrying EIGHT marks each.
4. **Select atleast TWO** questions from **SECTION - B & C.**

SECTION-A

Answer following questions in brief :

- 1) State superposition theorem.
- 2) What do you mean by time domain analysis? Discuss.
- 3) Differentiate between average value and rms value.
- 4) What do you mean by resonance? Explain.
- 5) Discuss the significance of phasor diagram in electrical engineering.
- 6) Draw and explain the BH curve.
- 7) Explain the terms regulation and efficiency with respect to transformer.
- 8) Discuss the significance of torque slip characteristic.
- 9) What do you mean by MCB? Discuss its importance.
- 10) What is the need of Earthing? Discuss.

SECTION-B

- 11) State Kirchhoff's Laws. Also calculate the voltage V_1 and the e.m.f. E_2 for the network shown below. (8)

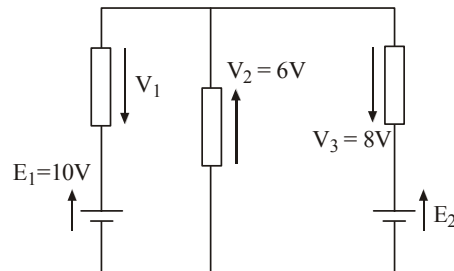


FIG.1

- 12) Explain the following : (8)
- Real power
 - Reactive power
 - Apparent power
 - Power factor
- 13) a) Discuss the effect of a sinusoidal current flowing through a coil having an inductance of L henrys and a negligible resistance. (3)
- b) A coil having both resistance and inductance, has a total effective impedance of $50\ \Omega$ and the phase angle of the current through it with respect to the voltage across it is 45° lag. The coil is connected in series with a $40\ \Omega$ resistor across a sinusoidal supply. The circuit current is 3 A ; by constructing a phasor diagram, estimate the supply voltage and the circuit phase angle. (5)
- 14) State Thevenin's theorem. Determine the value and direction of the current in BD using Thevenin's theorem for the Wheatstone bridge shown below : (8)

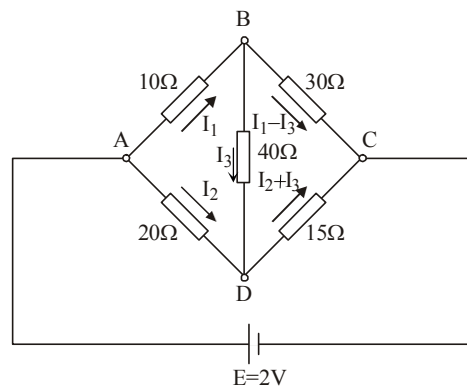


FIG.2

SECTION-C

- 15) Explain the principle of operation of a transformer. Also discuss the various losses that occur in a transformer.
- 16) Discuss the construction and working of three-phase squirrel cage induction motor.
- 17) Explain the following :
 - a) MCCB
 - b) ELCB
- 18) Explain the different types of batteries. Also discuss the important characteristics for batteries.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.

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Total No. of Pages : 02

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B.Tech (All Branches Physics Group) (2018 Batch) (Sem.-1,2)

BASIC ELECTRICAL ENGINEERING

Subject Code : BTEE-101-18

M.Code : 75339

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SECTION-A

1. **Answer following questions in brief.**
- a) Differentiate active and passive components.
 - b) Define R.M.S. value of A.C.
 - c) Differentiate phase and phasor difference with example.
 - d) What are various losses in transformer?
 - e) Give the working principle of boost converter.
 - f) Draw the static characteristics of thyristor.
 - g) What do you mean by duty ratio control in power converter?
 - h) Write the working principle of rotating magnetic fields.
 - i) List various types of wires and cables.
 - j) Significance of torque slip characteristics .

SECTION-B

2. Discuss in brief construction and principle of single phase induction motor. Also explain the losses.
3. Explain the working and basic principle of Single Phase Transformer.
4. Write a short note on :
 - a) Magnetization curve or B-H curve.
 - b) Kirchoff's voltage and current law.
5. Derive the relationship between voltage and current in star and delta connections.

SECTION-C

6. Explain the necessity of earthing in an electrical installation. Also state the points to be earthed in internal / wiring system of a residential building.
7. Open-circuit and short-circuit tests were conducted on a 50 kVA, 6360/240 V, 50 Hz, single phase transformer in order to find its efficiency. The observations during these tests are :
 - (a) Open-circuit test : Voltage across primary winding 6360 V. Primary current, 1.0 A. power input 2 kW.
 - (b) Short-circuit test : Voltage across primary 180 V , current in secondary winding 175 A, power input 2 kW. Calculate the efficiency of the transformer when supplying full load at power factor of 0.8 lagging.
8. Critically examine the difference between single phase and three phase voltage source inverters.
9. Explain the construction and working of synchronous generators.

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B.Tech All Branches Physics (2018 Batch) (Sem.-1)

BASIC ELECTRICAL ENGINEERING

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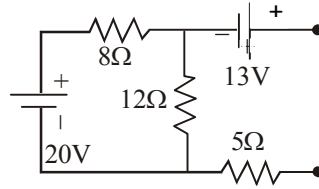
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SECTION-A

1. **Answer following questions in brief.**
 - a. Define ideal and practical voltage and current sources.
 - b. State and explain Kirchhoff's voltage law.
 - c. Define RMS value of any alternating quantity.
 - d. Write the voltage and current relations between line and phase values for star and delta connected three phase AC systems.
 - e. Draw the power triangle and define various types of powers.
 - f. Write the basic working principle of a transformer.
 - g. What do you understand by an auto-transformer?
 - h. Define synchronous speed and slip.
 - i. Why commutator and brushes are used in DC machines?
 - j. Define duty ratio of a converter.

SECTION-B

2. Calculate the Thevenin equivalent for the shown circuit.



3. Define the average value of alternating current having sine wave and derive its expression.
4. Explain the operation of series RL circuit with single phase AC supply.
5. Derive the EMF equation of a single phase transformer.

SECTION-C

6. Define resonance and derive the relation for resonance condition in a series RLC circuit.
7. Explain the construction of a single-phase transformer with the help of a neat sketch while mentioning the purpose of each component.
8. Explain the operation of a three-phase voltage source inverter with the help of its circuit diagram and associated waveforms.
9. Write short notes on any two of the following :
- a) DC buck and boost converters.
 - b) Generation of rotating magnetic field in a 3-ph Induction Motor.
 - c) Construction and working of a single phase induction motor.