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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST/SECOND SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017

Course Code: EE100

Course Name: BASICS OF ELECTRICAL ENGINEERING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks.

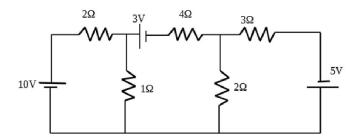
- Distinguish between an ideal voltage source and a practical voltage source. (4)
- 2 State Kirchhoff's laws. (4)
- 3 Compare electric and magnetic circuits. (4)
- What are the advantages of three phase systems? (4)
- A resistance of 10Ω and an inductive reactance of 10Ω are connected in series. (4) Calculate the value of impedance and draw the impedance triangle.
- 6 What are the advantages of high voltage transmission? (4)
- 7 Mention the different losses in a transformer. How these losses can be reduced? (4)
- A 220 V dc shunt motor draws a current of 50A. The armature resistance is 0.2Ω (4) and shunt field resistance is 40Ω . Calculate back emf.
- 9 Explain the principle of working of three phase induction motor. (4)
- Why single-phase induction motor is not self-starting. (4)

PART B

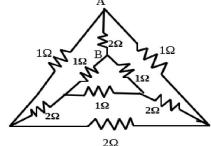
MODULE (1-4)

Answer any four questions, each carries 10 marks.

11 a) Calculate the power dissipated in 1Ω resistor in the following figure using node (6) voltage method.



b) Using star delta conversion, calculate the effective resistance between A and B of (4) the following figure.



12 a) An iron ring 15 cm mean diameter and 10 cm² in cross-section is wound with 200 (6)

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turns of wire. For a flux density of 1 Wb/m² and a relative permeability of 500, calculate the exciting current, inductance and energy stored when there is 2mm air gap.

- b) Derive an expression for the energy stored in a magnetic field. (4)
- 13 a) Define form factor. Also derive the form factor of a pure sinusoidal waveform. (5)
 - b) A series RC circuit takes a power of 7000W when connected to 200V, 50Hz (5) supply. The voltage across the resistor is 130V. Calculate:
 - i) Resistance
- ii) Power factor
- iii) Curren

- iv) Capacitance
- v) Impedance of the circuit.
- 14 a) Explain the method for three phase power measurement in a star connected system (5) using two wattmeter method with necessary diagrams.
 - b) A balanced star connected load of (8+j6) Ω per phase is connected to a three- (5) phase 230V supply. Find the line current, power factor and power consumed by the load.
- Explain the working of a thermal power plant with the help of a neat block (10) diagram.
- 16 a) Draw the layout of a typical electrical power transmission scheme.
- (5)

b) Write short note on the equipments used in a substation.

(5)

MODULE 5

Answer any one full question.

- 17 a) Explain different types of dc motors. Give one application of each. (5)
 - b) A 150 KVA single phase transformer has an iron loss of 750W and full load (5) copper loss of 2000W. Calculate the efficiency at half load, 0.8 power factor lagging.

OR

18 a) Derive the emf equation of a transformer.

- (5)
- b) A 25 KVA single phase transformer has 600 primary and 1200 secondary turns. (5) The net cross-sectional area of the core is 50 cm². If the primary winding is connected to a 230V 50Hz supply. Calculate:
 - i) Secondary emf
- ii) Maximum flux density in the core
- iii) Full-load primary and secondary currents.

MODULE 6

Answer any one full question.

- 19 a) What are the different types of three phase induction motors? What are their (5) advantages and disadvantages.
 - b) A 4 pole, 50Hz squirrel-cage induction motor runs at a speed of 970 rpm. (5) Calculate:
 - i) Slip ii) Frequency of induced current in the rotor.

OR

20 a) Write short note on the following: -

(10)

- i) Split phase induction motor and
- ii) Capacitor start induction motor
