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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

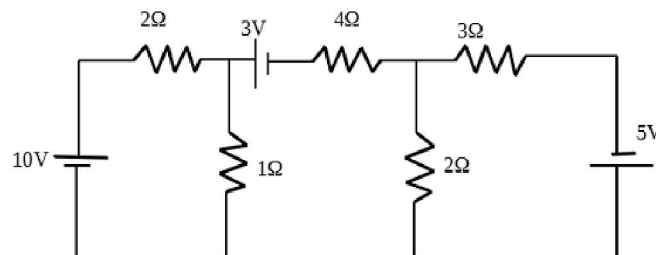
Duration: 3 Hours

PART A*Answer all questions, each carries 4 marks.*

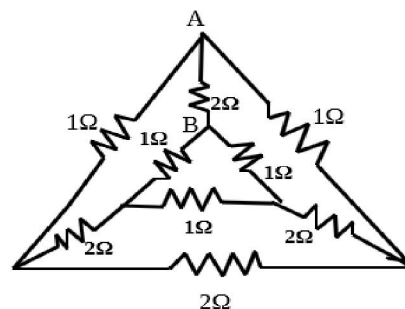
- 1 Distinguish between an ideal voltage source and a practical voltage source. (4)
- 2 State Kirchhoff's laws. (4)
- 3 Compare electric and magnetic circuits. (4)
- 4 What are the advantages of three phase systems? (4)
- 5 A resistance of 10Ω and an inductive reactance of 10Ω are connected in series. Calculate the value of impedance and draw the impedance triangle. (4)
- 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)
- 8 A 220 V dc shunt motor draws a current of 50A. The armature resistance is 0.2Ω and shunt field resistance is 40Ω . Calculate back emf. (4)
- 9 Explain the principle of working of three phase induction motor. (4)
- 10 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 voltage method. (6)



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



- 12 a) An iron ring 15 cm mean diameter and 10 cm^2 in cross-section is wound with 200 (6)

turns of wire. For a flux density of 1 Wb/m^2 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 supply. The voltage across the resistor is 130V. Calculate: - (5)
- i) Resistance ii) Power factor iii) Current
- iv) Capacitance v) Impedance of the circuit.
- 14 a) Explain the method for three phase power measurement in a star connected system using two wattmeter method with necessary diagrams. (5)
- b) A balanced star connected load of $(8+j6) \Omega$ per phase is connected to a three-phase 230V supply. Find the line current, power factor and power consumed by the load. (5)
- 15 Explain the working of a thermal power plant with the help of a neat block diagram. (10)
- 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 copper loss of 2000W. Calculate the efficiency at half load, 0.8 power factor lagging. (5)

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. The net cross-sectional area of the core is 50 cm^2 . If the primary winding is connected to a 230V 50Hz supply. Calculate: - (5)
- 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 advantages and disadvantages. (5)
- b) A 4 pole, 50Hz squirrel-cage induction motor runs at a speed of 970 rpm. Calculate: - (5)
- 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
