Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST/SECOND SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: EE100

Course Name: BASICS OF ELECTRICAL ENGINEERING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks. Marks

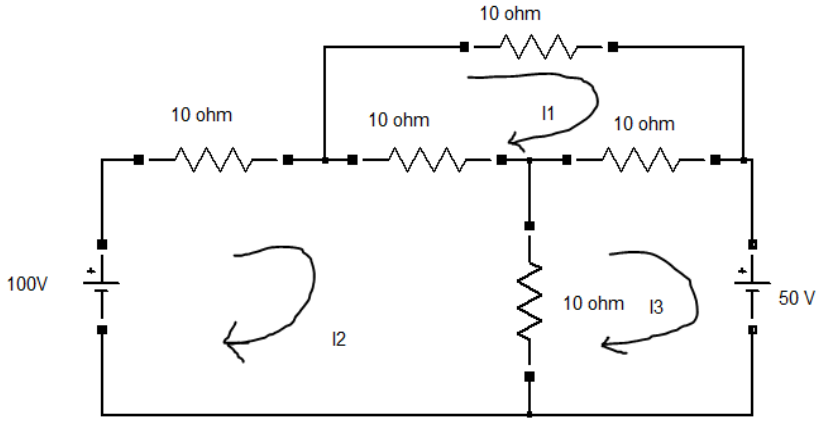
1	Explain Kirchhoff's voltage and current law with an example.	(4)
2	Define i) magnetic field intensity ii) flux iii) flux density iv) reluctance.	(4)
3	Define the following terms (i) RMS value (ii) Average value (iii) Frequency (iv) Time Period	(4)
4	In a single phase ac circuit consisting of an impedance of 10Ω, the RMS value of applied voltage is 230V. i) Write down the expression for instantaneous voltage ii) If the current lags the applied voltage by 30° write down the expression for instantaneous current iii) Calculate the power consumed in the circuit	(4)
5	Discuss the merits and demerits of hydro- electric power plant.	(4)
6	What are the environmental impacts of geothermal energy?	(4)
7	Explain the working principle of DC generator.	(4)
8	Explain the constructional details of core type transformer.	(4)
9	Explain the constructional details of the split phase induction motor.	(4)
10	Compare squirrel cage induction motor with slip ring induction motor.	(4)

PART B

MODULE (1-4)

Answer any four questions, each carries 10 marks.

11	Find mesh currents in the figure shown by mesh analysis	(10)



12 A steel ring of 25 cm diameter and of circular section 3 cm in diameter has an air gap of 1.5mm length. It is uniformly wound with 1000 turns of wire carrying a current of 2A. Calculate i) magnetomotive force ii) magnetic flux density in air gap iii) magnetic flux iv) relative permeability of steel ring. Assume that iron path takes about 40% of the total mmf. (10)

13 a) With the help of diagrams explain how an alternating voltage is generated using a single turn coil. (5)

b) A resistance of 5 Ω and an inductor of 15mH are connected in series across a 230V 50Hz single phase ac supply. Calculate the (i) current (ii) power factor (iii) power consumed (iv) What value of capacitor must be connected in series with this combination so as to improve the power factor to 0.9. (5)

14 A balanced three phase load consists of three coils each having resistance of 4Ω and inductance 0.02H. It is connected to a 415V, 50Hz, 3-phase ac supply. Determine the phase voltage, phase current, power factor and active power when the loads are connected in (i) star (ii) delta (10)

15 Draw a neat schematic diagram of a hydro-electric power plant and explain the functions of various components. (10)

16 Explain any two types of available non-conventional energy sources. (10)

MODULE 5

Answer any one full question, each carries 10 marks.

17 a) Derive the emf equation of a DC generator. (4)

b) With connection diagram , explain the different types of DC generators based on the type of field excitation given. (6)

18 a) What are the different types of losses occurring in a transformer? (2)

b) Write the expression for efficiency of a transformer. (2)

c) A single phase transformer has 400 primary turns and 1200 secondary turns. Primary winding is connected with 500V,50Hz supply. Find the flux density in the core and emf induced in the secondary winding. Cross sectional area of the core is 50cm^2. (6)

Also calculate the turns ratio of the transformer.

MODULE 6

Answer any one full question, each carries 10 marks.

19 a) Why a single phase induction motor is not self starting? (4)

b) How can we make a single phase induction motor self starting? Name the different types of single phase motors available based on starting methods? (6)

20 a) (8)

A 3-φ 4 pole induction motor is supplied from 3φ 50Hz ac supply. Find
(i) synchronous speed
(ii) rotor speed when slip is 4%
(iii) the rotor frequency when runs at 600r.p.m.

b) Classify induction motor according to its rotor construction (2)

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