Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 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

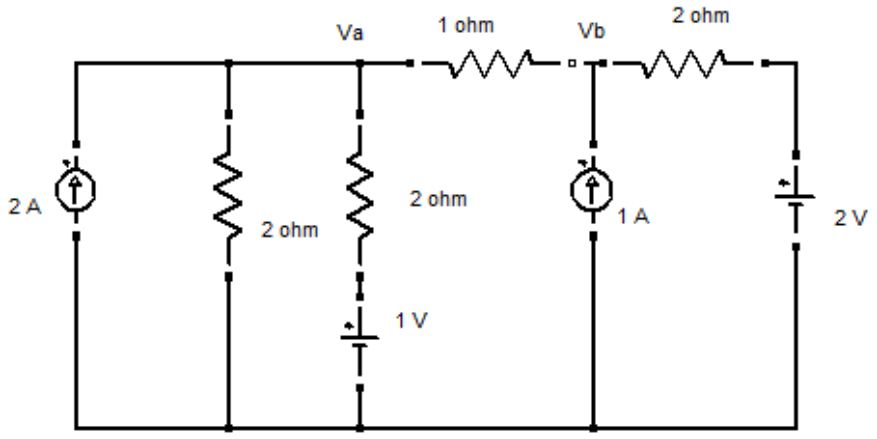
1	Draw and explain the V-I characteristics of ideal and actual voltage sources.	(4)
2	State and explain Faradays laws of electromagnetic induction.	(4)
3	Draw the phasor diagram showing all voltages and currents for the following ac circuits (i) series RL circuit (ii) series RC circuit	(4)
4	An alternating voltage of 100V is applied across a series RL circuit. If the voltage across the resistor is 70Ω find (i) voltage across the inductor (ii) power factor	(4)
5	Explain the general factors which influence the choice of site for hydroelectric power plants.	(4)
6	List the advantages and disadvantages of high voltage transmission.	(4)
7	Derive the EMF equation of a DC generator. Mention all the variables in it.	(4)
8	What are the losses occurring in a transformer. How they can be eliminated or minimised.	(4)
9	The frequency of e.m.f. in the stator of a 4-pole, 3-phase induction motor is 50Hz and that in the rotor is 2.5Hz. Determine (i) the slip (ii) speed of motor.	(4)
10	With neat circuit diagram, explain the working of capacitor start induction motor.	(4)

PART B

MODULE (1-4)

Answer any four questions, each carries 10 marks.

11 Find V_a and V_b using node analysis (10)



12 A mild steel ring of 30cm mean circumference has an air gap of length 1 mm. The cross sectional area of the ring is 6cm^2 and is wound with a wire of 500 (10)

turns. It is found that a current of 4A in the winding produces a flux density of 1T in the air gap. Find the relative permeability of mild steel

13 a) Find the values of circuit elements in a two element series circuit which consumes 700W at a power factor of 0.707 leading. The applied voltage is a single phase ac voltage given by v = 141.4 sin (314t). (6)

b) In two wattmeter method of three phase power measurement the total power measured was 30kW at a power factor of 0.7 lagging. Find the reading of each wattmeter. (4)

14 a) With a neat diagram , explain the generation of balanced three Phase alternating voltage. Also draw the three phase voltage waveform. (6)

b) A resistance of 120Ω and capacitive reactance of 250Ω are connected in series across a single phase ac voltage source. If a current of 0.9A is flowing in the circuit find (i)power factor (ii)supply voltage (iii)Active power (iv) reactive power (4)

15 Draw a neat schematic diagram of a Nuclear power plant and explain its operation. (10)

16 a) Draw and explain the single line diagram of a typical power transmission system (7)

b) What is the need for high voltage transmission? (3)

MODULE 5

Answer any one full question, each carries 10 marks.

17 a) A DC motor rated at 500V takes a current of 40A. The resistance of the armature is 0.2 ohm. The machine has 6 poles and the armature is lap wound with 864 conductors. If the flux per pole is 0.05Wb, calculate (i) speed of the motor (ii) torque developed by the armature. (8)

b) What will be the speed of the machine if the armature is wave wound. (2)

18 A transformer is rated 100kVA, 6600/400V. Determine the currents on high voltage and low voltage sides and turn ratio. If the maximum flux in the core is 0.02wb, find the number of turns on the primary and secondary. (10)

MODULE 6

Answer any one full question, each carries 10 marks.

19 Explain the constructional details of squirrel cage and slip ring induction motor (10)

20 a) Explain the principle of operation of a three phase induction motor. (6)

b) A 50Hz induction motor has 2 poles and runs at 2930 rpm. Calculate (4)

(i) The synchronous speed (ii) The percentage slip.

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