F 01000EE100092006 Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech S1 (S,FE) S2 (S) / S2 (FE) Examination May 2022 (2015 Scheme)

Course Code: EE100

Course Name: BASICS OF ELECTRICAL ENGINEERING

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each question carries 4 marks Marks

1		Three lamps are connected in series across a 180 V supply and take a current of 2.5 A. If the resistance of two of the lamps is 30 Ω each, what is the resistance of the third lamp?	(4)
2		Distinguish between ideal current source and practical current source.	(4)
3		Derive the expression for energy stored in an inductor.	(4)
4		State Faraday's law of electromagnetic induction.	(4)
5		Derive the relation between V_L and Vph, I_L and Iph of a star connected system.	(4)
6		Explain the phasor diagram of a RL circuit. Give expression for impedance and power factor?	(4)
7		Differentiate between feeders and distributors.	(4)
8		Derive the emf equation of a DC generator.	(4)
9		Enumerate the losses of a transformer.	(4)
10		Why is single phase induction motor not self-starting? Suggest one method for starting of single phase induction motor	(4)

PART B

MODULE (1-4)

Answer any four questions, each carries 10 marks

11	a)	A battery of emf 40V and internal resistance 2Ω is connected in parallel with a second battery of 44V and internal resistance 4Ω. A load resistance of 6Ω is connected across the ends of the parallel circuit. Calculate the current in each battery and in the load. (Solve using matrix method).	(7)
	b)	State and explain Kirchhoff's laws.	(3)
12	a)	A circular magnetic circuit has a mean length of iron 50cm and an airgap of 1mm. It is wound with a coil of 500turns carrying a current of 3A. The cross-	(6)

sectional area of the core is $10cm^2$.The mmf required for the airgap is 60% of the total mmf .Find the magnetic flux and total reluctance. Relative permeability of iron is 750.

b) Compare Electric and Magnetic circuits. (4)

13 a) An alternating voltage has the equation v =141.4 sin 377t, what are the values of (i) r.m.s voltage, (ii) frequency (iii) instantaneous voltage when t= 3 ms (5)

b) Explain active, reactive and apparent power (5)

14 a) A circuit having a resistance of 12 Ω, an inductance of 0.15 H and a capacitance of 100 μF in series is connected across a 100 V, 50 Hz, supply. Calculate (i) impedance, (ii) current (iii) V_R, V_L, V_C (iv) phase angle φ (7)

b) Derive the form factor of a sinusoidal waveform. (3)

15 a) Draw a neat block diagram of thermal power plant (5)

b) Enumerate the advantages of high voltage transmission (5)

16 Explain the substation equipments? (10)

MODULE 5

Answer any one full question

17 a) A four pole motor is fed at 440 V and takes an armature current of 50 A. The resistance of the armature circuit is 0.28 Ω. The armature winding is wave connected with 888 conductors and the useful flux/pole is 0.023 Wb. Calculate the speed. (5)

b) Explain Back emf? (5)

OR

18 Explain the working principle of a single phase transformer and derive its emf equation (10)

MODULE 6

Answer any one full question

19 Explain in detail the working principle of three phase induction motor (10)

OR

20 a) A three phase I/M is wound for 4 poles and is supplied from a 50 Hz system. Calculate (i) Synchronous speed (ii) speed of the rotor when the slip is 4% (iii) rotor frequency when the speed of the rotor is 600 rev/min (4)

b) Explain slip of an induction machine (3)

c) Compare squirrel cage and slip ring I/M (3)

*****