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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**B.Tech III Year I Semester Regular Examinations November/December 2018****ELECTRICAL MACHINES – III**

(EEE)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)**UNIT-I**

- 1 a Explain in detail the construction features of a salient and non salient pole alternator and list the difference between salient and non salient pole machines. 7M
- b Derive an expression for distribution factor and pitch factor. 5M

OR

- 2 a A 3 phase, 16 pole, star connected alternator has 144 slots on the armature periphery. Each slot contains 10 conductors. It is driven at 375 rpm. The line value of EMF available across the terminals is observed to be 2.675 KV. Find the frequency of the induced EMF and flux per pole. 7M
- b Derive the generalized expression for an induced EMF per phase in three phase alternator when coils are not full and concentrated in one slot. 5M

UNIT-II

- 3 a Describe the slip test method for the measurement of X_d and X_q of synchronous machine. 7M
- b A 3.5 MVA, slow speed, 3 Φ synchronous generator rated at 6.6 KV has 32 poles. Its direct and quadrature axis synchronous reactance as measured by slip test are 9.6 Ω and 6 Ω respectively. Neglecting armature resistance, determine the regulation and excitation EMF needed to maintain 6.6KV at the terminal when supplying a load of 2.5 MW of 0.8 p.f lagging. 5M

OR

- 4 a Define the terms synchronous impedance and voltage regulation of an alternator. Explain the synchronous impedance method of determining regulation of an alternator. 7M
- b State the assumptions made in the synchronous impedance method. 5M

UNIT-III

- 5 a Show that for alternators running in parallel, the division of load between them is governed mainly by the speed load characteristics of their prime movers. 7M
- b The speed regulation of two 500KV alternators A & B running in parallel are 100% to 104% and 100% to 105% from load to No Load respectively. How will the two alternators share the load of 800KW and also find the load at which one machine ceases to supply at any portion of load. 5M

OR

- 6 a Discuss load sharing between the two alternators. 7M
- b Two identical 2000 KVA alternators operate in parallel. The governor on first machine is such that the frequency drops uniformly from 50Hz on no load to 48Hz on full load the corresponding uniform speed drop of the second machine is 50Hz to 47.5Hz. 5M

UNIT-IV

- 7 a Explain the construction and principle of operation of a synchronous motor. 7M
b What could be the reason if a synchronous motor to start? 5M

OR

- 8 a Show that the current locus of a synchronous motor developing constant power is a circle determine its centre and radius. 7M
b Explain the functions of a damper winding in a synchronous motor. 5M

UNIT-V

- 9 a Draw the circuit diagram of a capacitor start capacitor run single phase induction motor and explain its working. 7M
b Explain the cross field theory of a single phase induction motor. 5M

OR

- 10 a Using double revolving field theory, explain why a single phase induction motor is not self starting. 7M
b Why a small fractional horse power AC series motor called universal motor. 5M

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