Exam. Code: 0934
Sub. Code: 33757

2055

B.E. (Electrical and Electronics Engineering)
Fourth Semester
PC-EE-401: Electrical Machine - II

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Missing data (If any) can be appropriately assumed.

x-x-x

Q1 a. How many windings are there in a synchronous machine and what are their time-constants? **(2)**

b. Draw the experimental set up for conducting open circuit test on a three phase synchronous machine. **(2)**

c. Write the expression for torque developed in a hysteresis motor due to eddy current loss. **(2)**

d. What are the stability ranges of salient and non-salient pole synchronous machine in terms of their load angles? **(2)**

e. Drive the expression for Short-Circuit-Ratio for a synchronous machine. **(2)**

Part –A

Q2. A 3-phase star-connected round rotor alternator is rated at 10 kVA, 230 V has per-phase effective armature resistance and synchronous reactance of 0.5 ohms and 1.2 ohms. Calculate the percentage voltage regulation at full load of at a power factor of : **(5,5)**

a. 0.8 leading

b. 0.8 lagging

Q3.a. Explain the working of a single-phase synchronous generator. **(5)**

b. Develop and analyse the phasor diagram of a salient-pole synchronous machine working as a generator at lagging power factor load. **(5)**

Q4. Analyse the V-curve of a three-phase synchronous machine working as generator with appropriate phasor diagram representation. **(5,5)**

P.T.O.

Part –B

Q5.a With the help of speed load characteristics, show the effect of active power change of one alternator on other when these are connected in parallel. **(5,5)**

b Two 1000 kVA 3-phase alternators are operating in parallel and supply a load of 1500 kVA at 0.8 lagging p. f. If one of the alternator is operating at 0.4 lagging p. f. and supplying 800 kVA, find the output of the other machine and the power factor at which it is operating.

Q6. Derive the torque and speed expressions for brushless DC (BLDC) machine with appropriate phasor-diagram and equivalent-circuit representation. **(10)**

Q7. Write short notes on: **(5,5)**

a. Universal machine.

b. Linear induction machine

x-x-x