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B.Tech.(EE)PT/(EE) (2011 Onwards)

B.Tech.(Electrical & Electronics) (2011 & 2012 Batch)

B.Tech. (Electrical Engineering & Industrial Control) (2012 Onwards)

(Sem.-5)

SYNCHRONOUS MACHINES

Subject Code : BTEE-501

M.Code: 70554

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Q1 Answer briefly :

- a. Define synchronous impedance of an alternator.
- b. What is excitation voltage of an alternator?
- c. Why damper winding is provided in salient pole synchronous motor?
- d. Write the conditions of parallel operation of alternators.
- e. What is a turbo alternator?
- f. Define synchronous reactance.
- g. What is salient pole type synchronous machine?
- h. What is synchronous condenser?
- i. What type of voltage is supplied to field of synchronous motor?
- j. Define transient stability of synchronous machine.



SECTION-B

- 2. Draw and explain phasor diagram of a cylindrical rotor alternator at leading power factor load.
- 3. Draw and explain the phasor diagrams at lagging power factor for salient pole synchronous motor.
- 4. What is the necessity of computing voltage regulation of an alternator?
- 5. Draw and explain internal and external characteristic of an alternator.
- 6. Describe briefly the construction and application of a hysteresis motor.

SECTION-C

- 7. Derive the expressions of electromagnetic power, reluctance power and total output power of a salient pole synchronous generator based on its phasor diagram. Draw and explain the power-angle characteristic for this machine.
- 8. Describe the constructional features, working principle and applications of single- phase reluctance motor.
- 9. A 2200 V, 400 kW, 3-phase star connected synchronous motor has a synchronous impedance of 0.3 + j3 ohm. Determine the excitation emf and the power angle if the motor works at rated load at 0.8 power factor leading and with an efficiency of 94%.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.