**Printed Pages:02** Sub Code: NIC-011 Paper Id: 1 3 1 6 3 5 Roll No.

## **B TECH**

# (SEM VI) THEORY EXAMINATION 2017-18 **ELECTRICAL MACHINES**

Time: 3 Hours Total Marks: 100

**Note:** Attempt all Sections. If require any missing data; then choose suitably.

### SECTION A

#### 1. Attempt all questions in brief.

 $2 \times 10 = 20$ 

- a) Define field energy and co-energy?
- b) What is the difference between synchronous and asynchronous machine?
- c) What is compensating winding?
- d) What is balance power?
- e) What is leakage reactance of synchronous machine?
- f) What is operating characteristics of synchronous generator?
- g) Why is single phase induction motor not self-starting?
- h) Write the necessary condition for parallel operation?
- i) Draw the phasor diagram of induction motor?
- i) What is the principle of single phase commutator motor?

### **SECTION B**

### 2. Attempt any three of the following:

 $10 \times 3 = 30$ 

- a) Explain the matching characteristics of electric machines and loads?
- b) Explain the Ward-Leonard scheme for speed control of dc shunt motor with the help of neat diagram and mention its advantages and limitations?
- c) A 3300 V, star-connected synchronous motor has synchronous impedance of (0.4 + 15)  $\Omega$  per phase. For an excitation e.m.f. of 4000 V and motor input power of 1000 kW at rated voltage, compute the line current and power factor.
- d) Discuss torque-slip characteristic for an induction machine by establishing an expression between torque and slip.
- e) Explain the construction and operation of single phase induction motor?

## SECTION C

### 3. Attempt any one part of the following:

 $10 \times 1 = 10$ 

- a) Explain the basic operation of the DC machines with neat sketch?
- b) Derive the expression for generated E.M.F. of AC Machine?

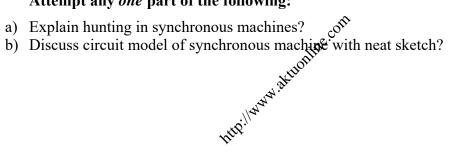
#### Attempt any one part of the following: 4.

 $10 \times 1 = 10$ 

- a) Explain the basic fundamental of D.C. motor starting. Also explain the four-point starter for D.C. shunt motor?
- b) Explain breaking of dc motor with suitable diagram if needed?

### Attempt any one part of the following: 5.

 $10 \times 1 = 10$ 



# 6. Attempt any *one* part of the following:

 $10 \times 1 = 10$ 

- a) Draw the speed-torque characteristic of induction motor? Drive the expression for maximum torque of induction motor?
- **b)** Discuss the construction, flux and m.m.f. phasor in induction motors with neat sketch?

# 7. Attempt any *one* part of the following:

 $10 \times 1 = 10$ 

- a) Discuss the operating principle working of split phase motor?
- b) Explain the constructional features and operating principle of stepper motor?