Printed Pages:02 **Sub Code: NIC-011**

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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 x 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?
j) What is the principle of single phase commutator motor?

SECTION B

2. Attempt any *three* of the following: 10 x 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 + j5) Ω 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 x 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?

4. Attempt any *one* part of the following: 10 x 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?

5. Attempt any *one* part of the following: 10 x 1 = 10

a) Explain hunting in synchronous machines?
b) Discuss circuit model of synchronous machine with neat sketch?

6. Attempt any *one* part of the following: 10 x 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 x 1 = 10

a) Discuss the operating principle working of split phase motor?

b) Explain the constructional features and operating principle of stepper motor?