

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018– 19 Examination

Semester: 3
Subject Code: 03106204
Subject Name: Electrical Machines

Date: 29/05/2019
Time: 02:00pm to 04:30pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions**(15)**

1. A 440 V/220 V transformer has 2000 turns on the primary winding. The number of turns on the secondary windings is _____.
2. The armature resistance of a D.C. motor is 0.5Ω , the supply voltage is 230 V. The armature current of D.C. motor at starting will be _____.
3. A 400 V, Three-phase, 4-pole, 50 Hz Alternator, the synchronous speed is _____.
4. A 4 pole, 50 Hz, three-phase induction motor rotates at 1440 rpm, slip of motor is _____.
5. A single-phase induction motor is inherently not _____ motor.
6. Draw phasor diagram of single-phase transformer at load.
7. Why starting current of D C motor is high? Explain it.
8. Give the application of reluctance motor.
9. Give the classification of D C generators.
10. Why short-circuit and open-circuit test perform on H V side and L V side respectively?
11. Write the different starting method of Three-phase induction motor.
12. A DC shunt machine develops an open circuit e.m.f. of 230 V at 1500 rpm. Find its developed torque for an armature current of 20 A.
13. A three-phase induction motor is also known as

(A) Synchronous machine	(B) Asynchronous machine
(C) Both of above	(D) None of above
14. In Thermal Power Plant which generators are generally used

(A) Synchronous generator	(B) D C generator
(C) Induction Generator	(D) All of the above
15. The speed of a D.C. motor may be increased by

(A) Increasing the armature currents	(B) Decreasing the field current
(C) Decreasing the applied voltage	(D) Increasing the field current

Q.2 Answer the following questions. (Attempt any three)**(15)**

- A) Derive EMF equation of single-phase Transformer.
- B) Derive torque equation of DC motor.
- C) Derive expression of starting torque and full-load torque of three-phase induction.
- D) Explain construction details of synchronous generator.

Q.3 A) Discuss the difference between three-phase induction motor and transformers.**(07)**

- B) Derive the condition at which maximum efficiency of transformer occurs?

(08)**OR**

- B) A 4-pole lap-connected dc generator has no-load generated e.m.f of 500 V when driven at 1200 rpm. Calculate the flux per pole if the armature has 12 slots with 6 conductors per slot.

(08)**Q.4 A) Discuss the importance of excitation in DC machine. Also discuss different types of field excitation employ in DC machine.****(07)****OR**

- A) Why do we conduct sumpner test on transformers? Explain sumpner test in detail.

(07)

- B) A 400 V, 3-phase, 50 Hz induction motor takes a power input of 35 kW at its full-load speed of 980 rpm. The total stator losses are 1kW and the friction and windage losses are 1.5 kW. Calculate (a) slip (b) rotor ohmic losses (c) shaft power and (d) efficiency.

(08)