

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Winter 2019 - 20 Examination

Semester: 5**Subject Code: 03110306****Subject Name: Electrical Machines and Power Utilization****Date: 13/12/2019****Time: 10:30am to 1:00pm****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 - (Each of one mark)**(15)**

1. A transformer core is laminated to reduce _____ losses
2. A step-up transformer wills ___ voltage to the secondary.
3. Any motor may become hot when subjected to_____
4. The transformer ratings are usually expressed in terms of _____.
5. No-load test on a transformer is carried out to determine _____
6. _____winding in a transformer has more number of turns?
7. An ideal transformer will have maximum efficiency at a load such that _____
8. While conducting short-circuit test on a transformer the following side is short circuited
 - (a) High voltage side
 - (b) Low voltage side
 - (c) Primary side
 - (d) Secondary side
9. Which of the following does not change in an ordinary transformer?
 - (a) Frequency
 - (b) Voltage
 - (c) Current
 - (d) Any of the above
10. The value of flux involved m the e.m.f. equation of a transformer is
 - (a) average value
 - (b) r.m.s. value
 - (c) maximum value
 - (d) instantaneous value
11. The direction of rotation of a D.C. series motor can be changed by
 - (a) interchanging supply terminals
 - (b) interchanging field terminals
 - (c) either of (a) and (b) above
 - (d) None of the above
12. Starters are used with D.C. motors because
 - (a) these motors have high starting torque
 - (b) these motors are not self-starting
 - (c) back e.m.f. of these motors is zero initially
 - (d) to restrict armature current as there is no back e.m.f. while starting
13. For starting a D.C. motor a starter is required because
 - (a) it limits the speed of the motor
 - (b) it limits the starting current to a safe value
 - (c) it starts the motor
 - (d) none of the above
14. Efficiency of a power transformer is of the order of _____%
15. The speed-torque characteristics of a repulsion induction motor resemble to that of dc _____ motor.

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

- A) Enlist different speed control methods of DC Series motor. Explain Field and armature control method with necessary diagram.
- B) What is Transformer? Explain the construction and working principle of transformer?
- C) Which are the applications of Induction motors? Briefly describe the construction and working of 3- phase induction motor.
- D) Explain the direct load test for determination of voltage regulation and efficiency of transformer with necessary diagram.

Q.3 A) List out the methods to improve the power factor of the induction motor and explain with necessary diagram Also state the disadvantages of low power factor. **(07)**

B) Explain the double field revolving theory with reference to single phase induction motor. **(08)**

OR

B) What are the applications of transformer? Derive an emf equation for transformer with usual notation. **(08)**

Q.4 A) Which are the methods of three phase power measurement? Explain each method with diagram and necessary mathematical expressions and phasor diagram. **(07)**

OR

A) Define voltage regulation of a transformer. Describe the method to find out voltage regulation of a transformer using open circuit and short circuit tests. **(07)**

B) Discuss the power flow diagram of a DC machine explain the internal characteristic of a DC shunt generator with classification of DC machines. **(08)**