

**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**B.Tech. Summer 2021 - 22 Examination**

**Semester: 8****Subject Code: 03106453****Subject Name: AC Machine & Transmission Line Design****Date: 30/03/2022****Time: 10:30 am to 01:00 pm****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 - (All are compulsory) (Each of one mark) (15)**

1. Full form of EHV is \_\_\_\_\_.
2. The equivalent spacing between conductors for 166 kV line is \_\_\_\_\_.
3. \_\_\_\_\_ kV is one of the standard voltage used in primary distribution system.
4. Surface roughness factor for stranded conductor is \_\_\_\_\_.
5. Pin type insulators can be used up to \_\_\_\_\_ kV.
6. Irregular air-gap in rotating electrical machines results into unbalanced magnetic pull. State True or False.
7. Number of slip rings used in squirrel cage induction motor is \_\_\_\_\_.
8. In synchronous generator the field coils are on \_\_\_\_\_.
9. Which type of rotor construction is used for machines driven by steam turbines?
10. Damper windings are provided in the pole faces of salient pole alternators. State True or False.
11. The minimum clearance between adjacent field coils should be \_\_\_\_\_ mm.  
 (a) 15 mm      (b) 10 mm      (c) 25 mm      (d) 5 mm
12. Permissible value of maximum flux density in rotor teeth on induction motor for minimum tooth width can be taken as \_\_\_\_\_ wb/m<sup>2</sup>.  
 (a) 1.7      (b) 2.0      (c) 2.2      (d) 1.2
13. For overall good design of induction motor core-length to pole pitch ratio can be taken as \_\_\_\_\_.  
 (a) 1.0      (b) 1.5      (c) 2.0      (d) 1.25
14. Higher value of current density in stator winding of induction motor reduces \_\_\_\_\_.  
 (a) area of conductor      (c) weight  
 (b) cost      (d) All of above.
15. Current density in end-rings of squirrel cage induction motor can be taken as \_\_\_\_\_ A /mm<sup>2</sup>.  
 (a) 4.5      (c) 3.5  
 (b) 3.0      (d) 2.5

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

- A) Why design of transmission line is very vital?
- B) List out steps for electrical design of transmission line.
- C) Explain the effect of SCR on machine performance.
- D) Explain cogging in induction motor.

**Q.3 A) Discuss the factors affecting selection of number of stator slots in induction motor. (07)****B) Derive the output equation for ac machines. (08)****OR****B) Explain distribution of rotor bar current and end ring current in squirrel cage rotor and derive the equation of end ring current  $I_e = S_r I_b / \pi p$ . (08)****Q.4 A) Discuss in details various types of losses in synchronous machines. (07)****OR****A) Determine a suitable number of slots and conductors per slot, for the stator winding of a 3 phase (07)  
 3300 V, 50 Hz, 300 rpm alternator. The diameter is 2.3 m and the axial length of core is 0.35 m. The maximum flux density in the air-gap should be approximately 0.9 Wb /m<sup>2</sup>. Assume sinusoidal flux distribution. Use single layer winding and star connection for stator.****B) List out the points to be considered while designing EHV transmission lines. (08)**