



R17 Regulation

Subject code: 1E6BB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Year II Semester Supplementary Examinations, January 2023

DESIGN OF ELECTRICAL MACHINES
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Maximum Marks: 70

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

1. Classify the electrical engineering materials.
2. Define specific magnetic loading.
3. What is window space factor.
4. Write few salient points on leg spacing?
5. What is cogging of induction motor?
6. Induction motor can be called as rotating transformer. comment on it.
7. Name the different methods available to reduce harmonics in synchronous machine
8. Which type of synchronous generators are used in water wheel alternators and turbo alternators
9. List out the limitations of traditional designs of electrical machines
10. What are the optimization techniques used in design of electrical machines

Part-B

Answer All the following questions.

(10MX 5=50Marks)

11. A. Explain the modern trends in electrical machine design.
B. List of desirable properties of conducting materials used in electrical machines. Name few conducting materials. [5+5]
12. Discuss about the factors that influence the choice of specific electric and magnetic loadings in the design of rotating machines. [10]
13. A. Explain different methods of cooling in a transformer.
B. Derive the output equation of 3-phase transformer. [5+5]
14. Explain the step by step procedure for the design of core, shell type transformer, windings and yoke. [10]
15. A. Discuss the advantages and disadvantages of having small airgap of a 3-phase induction motor.
B. Explain the factors to be considered while designing the rotor bars and slots of an induction motor. [5+5]

OR

- 16 Determine the main dimensions, number of radial ventilating ducts, number of stator slots and number of turns/ phase of a 3.7kW, 3 phase, 4 pole, 50Hz, squirrel cage induction motor. Average flux density= 0.45 Wb/m^2 ac=23000 amp.cond/m, full load efficiency=0.85, pf=0.84, winding factor=0.955, stacking factor=0.9. [10]
- 17 A. Mention the factors that govern the design of field system of an alternator.
B. Discuss the cooling methods of turbo alternator. [5+5]
- OR
- 18 Explain the design procedure for stator and rotor of a turbo alternator. [10]
- 19 Explain the different approaches of computer aided design of electrical machines. [10]
- OR
- 20 A. List out few salient points of Finite element method design of electrical machines.
B. Explain the working of switched reluctance motor. [5+5]