



Paper id: 251029

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Subject Code: BEE062

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**BTECH**  
**(SEM VI) THEORY EXAMINATION 2024-25**  
**ELECTRICAL MACHINE DESIGN**

TIME: 3 HRS

M.MARKS: 70

**Note:** Attempt all Sections. In case of any missing data; choose suitably.**SECTION A****1. Attempt all questions in brief.****02 x 7 = 14**

Q no.	Question	CO	Level
a.	What will happen if the induction motor air gap increases?	3	K6
b.	What is voltage regulation of transformer?	2	K6
c.	What are the various constraints of design amachine?	1	K5
d.	What are specific electric and magnetic loadings?	1	K5
e.	Why rotors slots of the induction motor are skewed?	3	K6
f.	What is Computer Aided Design?	4	K6
g.	What is ratio of no load to full load current of three phase induction motor?	3	K6

**SECTION B****2. Attempt any three of the following:****07 x 3 = 21**

a.	Discuss the various classes of insulation in terms of temperature?	1	K5
b.	Derive the mathematical expression of KVA rating of three core type transformers in terms of space factor and window area?	2	K6
c.	Write the difference between core type and shell type of transformer?	2	K6
d.	Describe about the factors influencing the choice of a) specific magnetic loading and b) specific magnetic loading of the 3-phase machine?	3	K6
e.	Discuss no load current, voltage regulation and derive the expression of efficiency of transformer?	2	K6

**SECTION C****3. Attempt any one part of the following:****07 x 1 = 07**

a.	Derive the mathematical expression of KVA rating of three phase shell type transformers in terms of space factor and window area?	2	K6
b.	Explain the core and armature design of dc and 3-phase ac machines.	3	K6

**4. Attempt any one part of the following:****07 x 1 = 07**

a.	Explain the synthesis and hybrid methods of computer aided design?	4	K6
b.	Prove that emf/turn of single-phase transformer is $KQ0.5$ , where Q is output KVA rating/phase	2	K6

**5. Attempt any one part of the following:****07 x 1 = 07**

a.	Explain the design of field system of DC machine?	3	K6
b.	Explain the modern trends in design and manufacturing techniques?	1	K5

**6. Attempt any one part of the following:****07 x 1 = 07**

a.	Explain the selection and guidelines of number of poles of DC machine?	3	K6
b.	Explain the design of field system of salient pole rotor and non- salient pole rotor of alternator?	3	K6

**7. Attempt any one part of the following:****07 x 1 = 07**

a.	Define the limitations of traditional designs and need of computer aided design (CAD) of electrical machines? Discuss different methods of CAD using flow charts?	4	K6
b.	Explain the cooling system designs of the transformers?	2	K6