**Code No.PC405EE**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E. (EEE) IV-Semester (Supplementary) Examination, FEB-2024**

**Subject: ELECTRICAL MACHINES-I**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.(10X2M=20M)**

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| --- | --- | --- | --- | --- |
| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | What is electro mechanical system? | **2M** | **1** | **1** |
| **b** | Define Field energy | **2M** | **1** | **1** |
| **c** | What are the various methods of improving commutation? | **2M** | **2** | **1** |
| **d** | What is the purpose of laminating the core? | **2M** | **2** | **1** |
| **e** | Why is the starting current in dc motors very high? Describe the need of starter? | **2M** | **3** | **2** |
| **f** | Define efficiency of dc machine and give its losses? | **2M** | **3** | **2** |
| **g** | Why transformer rating is expressed in terms of kVA? | **2M** | **4** | **2** |
| **h** | Draw the exact equivalent circuit of a Transformer. | **2M** | **4** | **2** |
| **i**  **j** | What are the advantages of auto transformer over two winding transformers?  Define energy efficiency and voltage regulation of transformer? | **2M**  **2M 5** | **5**  **5** | **1**  **1** |

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**PART-B**

**Answer Any Five questions**.**(5X8M=40M)**

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | Explain Faraday’s Laws of Electro Magnetic Induction in detail | **4M** | **1** | **3** |
| **b** | Differentiate between single excited and doubly excited Magnetic System. | **4M** | **1** | **3** |
| **3.** | **a** | Distinguish between external and internal characteristics of DC Generators | **4M** | **2** | **3** |
| **b** | A 4-pole generator has a wave-wound armature with 722 conductors, and it delivers 100 A on full load. If the brush lead is 80 calculate the armature demagnetizing and cross magnetizing ampere turns per pole | **4M** | **2** | **3** |
| **4.** | **a** | Draw and explain the Electrical characteristics of DC series and shunt motor. | **4M** | **3** | **3** |
| **b** | A 250V shunt motor runs at 1000 rpm at no load and takes 8A. The total armature and shunt field resistances are 0.2 and 250 ohms respectively. Calculate the speed when loaded and taking 50A. Assume the flux to be constant | **4M** | **3** | **3** |
| **5.** | **a** | With the help of neat sketch, explain in detail about parallel operation of single-phase transformers. | **4M** | **4** | **3** |
| **b** | Mention the different tests that are conducted on Transformer? Explain the procedure for conducting Sumpner’s test along with all precautions to be taken while conducting the test with neat diagram | **4M** | **4** | **3** |
| **6.** | **a** | Explain the effect of third harmonics in phase voltages of three phase transformers. | **4M** | **5** | **3** |
| **b** | What is auto transformer? Explain the working principle of auto transformer | **4M** | **5** | **3** |
| **7.** | **a** | Explain in detailed about Principle of Energy Conversion | **4M** | **1** | **3** |
| **b** | Derive e.m.f equation of DC generator | **4M** | **2** | **3** |
| **8.** | **a** | Explain principle of operation of DC motor with a neat sketch | **4M** | **3** | **3** |
| **b** | Define efficiency and regulation of a transformer. Show how the power factor affects both of them | **4M** | **4** | **2** |
| **9.** | **a** | Give the comparison of autotransformer with two winding transformer on various aspects. | **4M** | **5** | **3** |
| **b** | Explain with a neat sketch, the function of a 3-point starter | **4M** | **2** | **3** |

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