**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**Supplementary Summer 2024**

**Course: B. Tech.** **Semester : III**

**Branch: Electrical Engineering / Electrical Engineering (Electronics and Power)/ Electrical & Electronics Engineering / Electrical & Power Engineering.**

**Subject Code & Name: Electrical Machine- I [BTEEC302]**

**Max Marks: 60** **Date: 02/07/2024** **Duration: 03:00 Hrs.**

***Instructions to the Students:***

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

| | | (Level/CO) | Marks |
|---|---|---|---|
| **Q. 1** | **Solve Any Two of the following.** | | **12** |
| **A)** | Draw phasor diagram to represent conditions in a single-phase transformer supplying load at 1. Unity power factor, 2. Lagging power factor 3. Leading power factor | Understand | **6** |
| **B)** | What are the tests required to draw the equivalent circuit of a Single phase Transformer and How they are conducted? | Remember | **6** |
| **C)** | 40 KVA transformers have iron loss of 450W and full-load copper loss of 850W. If the power factor of the load of 0.8 lagging, calculate:<br>i. Full-load efficiency<br>ii. The load at which maximum efficiency occurs<br>iii. The maximum efficiency. | Evaluate | **6** |
| **Q.2** | **Solve Any Two of the following.** | | **12** |
| **A)** | Describe the various three phase transformer connections. Draw circuit diagram and vector diagram of Δ- Δ three phase transformer connections | Understand | **6** |
| **B)** | Compare Current Transformer and Potential Transformer | Remember | **6** |

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|---|---|---|---|
| **C)** | A 5KVA, 240/2400V, 50Hz single phase transformer has the maximum value of .flux density as 1.2 Tesla. If the e.m.f. per turn is 8V. Calculate the number of primary and secondary turns and the primary and secondary current at full load | Evaluate | **6** |

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|---|---|---|---|
| **Q. 3** | **Solve Any Two of the following.** | | **12** |
| **A)** | Explain Dynamic equations of electromechanical systems and analytical techniques. | Understand | **6** |
| **B)** | Explain Armature Reaction in DC generator and Effect of Armature Reaction | Understand | **6** |
| **C)** | Write the difference between single and multiple excited systems? | Remember | **6** |

| | | | |
|---|---|---|---|
| **Q.4** | **Solve Any Two of the following.** | | **12** |
| **A)** | Draw and explain types of DC machines with circuit Diagrams. | Remember | **6** |
| **B)** | Derive the expression of the torque in the dc motor. State clearly the meaning of the symbols used | Understand | **6** |
| **C)** | State and Explain the different types of Speed control Techniques of DC machine | Create | **6** |

| | | | |
|---|---|---|---|
| **Q. 5** | **Solve Any Two of the following.** | | **12** |
| **A)** | Explain the permanent magnet stepper motor and with their applications | Understand | **6** |
| **B)** | Explain the construction and working of BLDC motor with their applications | Understand | **6** |
| **C)** | Explain the construction and working of reluctance motor with their applications | Remember | **6** |

***** End *****