

2112E142

**BACHELOR OF VOCATION**  
**Automotive Component Manufacturing**  
**Subject: Electrical Machines and Drives**  
**Subject Code: LBME-204**  
**Semester: Fourth**  
**December 2021**  
**Theory (External): 35 Marks**  
**Time: 03 hours**

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**Instructions to the Students**

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

**Roll Number**

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**SECTION -A (OBJECTIVE TYPE QUESTIONS)**  
**(10x1=10 Marks)**

- A. What happens if the relative speed between the rotating stator flux and rotor becomes zero?
- Slip of the motor will be finite value
  - The rotor will stop rotating
  - Rotor will run at a very high speed
  - Torque produced will be very high
- B. Which of the following motors can be run both on ac and dc supply?
- Universal motor
  - Repulsion motor
  - Synchronous motor
  - Reluctance motor
- C. Ceiling fan uses
- Split phase motor
  - Capacitor start capacitor run motor
  - Universal Motor
  - Synchronous Motor
- D. Transformer cores are laminated in order to
- Reduce hysteresis loss
  - Reduce hysteresis & eddy current loss
  - Minimize eddy current loss
  - Copper loss

- E. A transformer has 2% resistance and 5% reactance. What is its voltage regulation at full load with 0.8 p.f. lagging?
- 5.3%
  - 4.6%
  - 0.53%
  - 0.46%
- F. Starters are used in DC motors because
- These motors have high starting torque
  - These motors are not self-starting
  - Back e.m.f. of these motors is zero initially
  - To restrict armature current as there is no back e.m.f. while starting
- G. Buses, trains, hoists, cranes require high starting torque and therefore make use of
- DC series Motor
  - DC Shunt Motor
  - Induction Motor
  - All of the above
- H. Power in terms of speed and torque can be expressed as
- $P = T \cdot \omega$
  - $P = T / \omega$
  - $P = \omega / T$
  - $P = \omega / T^2$
- I. Chopper is a

- a. AC - DC converter
- b. AC - AC converter
- c. DC - AC converter
- d. DC - DC converter

J. In a squirrel cage induction motor, the rotor slots are given a slight skew in order to

- e. Reduce windage losses
- f. Reduce eddy currents
- g. Reduce accumulation of dirt and dust
- h. Reduce magnetic hum

**SECTION -B (ESSAY TYPE QUESTIONS)**  
(5x5=25 Marks)

**Q 1** Discuss the characteristics of DC shunt motor and thereby enlist the applications of DC these motors. 5

**Q 2** Why are the cores of transformers laminated? A 500/250V, 50 Hz, core type transformer is to work at a maximum flux density of 1.2T in the core. The effective cross-sectional area of the core is 90 square cm. Calculate the suitable values of primary and secondary turns. 1+4

**Q 3** Describe the star-delta and delta-star connections for three phase transformers using suitable diagrams. List their applications also. 2.5+2.5

**Q 4** Why is a starter necessary for a DC motor? Discuss the function of no-volt release and overload release in a three point starter. 1+2+2

**Q 5** What is the difference between cage rotor and wound rotor Induction motor? Discuss their relative advantages and disadvantages. 5

**Q 6** A 4 pole induction motor is run at 1450 rpm from a 50 Hz supply. Find the percentage slip and frequency of rotor current. 2.5+2.5

**Q 7** Why are single phase Induction motors not self-starting? Discuss using Double revolving field theory. How can they be made self starting? 4+1

**Q 8** With suitable diagrams discuss the two quadrant chopper control of a separately excited DC motor. 5

===END OF PAPER===