

Please check that this question paper contains \_\_\_\_\_ questions and \_\_\_\_\_ printed pages within first ten minutes.

[Total No. of Questions: 09]

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Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)

Semester: 1

Name of Subject: Basic Electrical Engineering

Subject Code: ESC-101

Paper ID: 15929

Scientific calculator is Allowed

MORNING

13 MAY 2023

**Time Allowed: 03 Hours**

**Max. Marks: 60**

**NOTE:**

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

**Part – A**

**[Marks: 02 each]**

**Q1.**

- a) Define Resonance for an AC circuit.
- b) Define the term phase splitting.
- c) State Norton Theorem with example.
- d) Name any four components of LT Switchgear.
- e) How the efficiency of a transformer is depending on copper losses?
- f) A lead acid cells maintains a constant current of 3A for 10 hours before its terminal voltage falls to 1.8V. Calculate the capacity of the cell.

**Part – B**

**[Marks: 04 each]**

- Q2.** Define Apparent power, Active power and reactive power for AC system.
- Q3.** Explain the losses occurring in a transformer. Write an expression for calculating efficiency.
- Q4.** Explain the construction and working principle of moving iron instrument.
- Q5.** Why there is a need of starter in three phase induction motor?
- Q6.** Discuss about Power factor correction methods.

- Q7.** A 3 phase 4 pole 50 Hz induction motor has a fractional slip 0.02 at no load and 0.04 at full load.

Calculate: Synchronous speed, No load speed of motor, Full load speed of motor, Frequency of rotor at full load.

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**Part – C**

**[Marks: 12 each]**

- Q8.** Describe the construction and working of permanent magnet moving coil instrument. What are its merits and demerits.

OR

Explain in detail the types of batteries with battery characteristics and types of cables.

- Q9.** A 600/200, 50Hz, 20 kVA transformer has primary and secondary winding resistances of  $3\Omega$  and  $0.8\Omega$  and winding leakage reactance of  $6\Omega$  and  $2\Omega$  respectively. Draw the equivalent circuit and find the equivalent resistance and reactance referred to primary side.

OR

Deduce an expression for Current, Impedance, Power factor and power of RL series circuit when an AC voltage is supplied. When a voltage of  $300\sin(2\pi t)$  is applied to a coil having resistance  $250\Omega$  and Inductance  $0.45H$ . Determine the expression of current and power taken by coil with phasor diagram.

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