RefNo:Ex/EE/PE/H/T/326B/2023

Bachelor of Engineering in Electrical Engineering Examination, 2023

(3rd Year 2nd Semester)

SUBJECT: - CONDITION MONITORING OF ELECTRICAL SYSTEMS

Full Marks 100

Time: ~~Two hours~~/Three hours/ ~~Four hours/ Six hours~~ (50 marks for each part)

Use Separate Answer scripts for each Part

Part I

Answer all questions

Q 1. What do you understand by the term "Condition Monitoring"? How does it differ from protection? 10

or

Discuss : How machine specification is related to machine failure?

Q 2. Discuss in brief what is "environmental aging" of electrical machines and what are its effects? 10

or

Discuss in brief what is "mechanical aging" of electrical machines and what are its effects?

Q 3. Write short notes on (any two) 5x2

a) Surface Tracking and Moisture absorption
b) Thermal aging
c) Partial discharge

Q 4. Discuss in brief, the effects of common faults of electrical machines? 10

or

Discuss in brief what are the common faults of large Induction Motors.

Q 5. Define the following terms (any five): 5x2

Availability; time of failure; time of repair; failure rate; time between failure; mean time between failure

[Turn over

Ex/EE/PE/H/T/326B/2023

B.E. ELECTRICAL ENGINEERING EXAMINATION, 2023

(3rd Year, 2nd Semester)

CONDITION MONITORING OF ELECTRICAL SYSTEMS (HONS.)

Time: Three Hours Full Marks: 100

(50 marks for each part)

Use a **separate** Answer-script for each Part

PART-II

Answer ***any three*** questions

Two marks are reserved for neat and well-organized answer script

1. a) With a suitable schematic, explain a typical test instrument hook-up to measure insulation resistance. 6

   b) How to interpret the readings of insulation resistance? 5

   c) What is meant by Short-Time or Spot-Reading Test? Why this method has less reliability? 5

2. a) Explain (i) Polarization Index (PI) test and (ii) Dielectric Absorption (DA) test. How do you interpret the condition of the insulation from these tests? 10

   b) Why step voltage testing is done to assess the condition of the insulation? 6

3. a) How dissolved gas analysis is done in the case of oil-filled transformer. 8

   b) Write a note on "Duval's Triangle" highlighting some typical fault classification. 8

4. Explain the basic concept behind polarization and depolarization current measurement in oil-paper insulation. Describe with the help of a schematic how polarization and depolarization current (PDC) measurement can be performed on transformers. 16

5. What is frequency domain spectroscopy? Explain an experimental setup to perform frequency domain spectroscopy. With the help of suitable data, show how the effect of moisture in insulation can be interpreted by FDS. 16