B.E. Electrical Engineering - Fourth Year - Second 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 any five

Q 1.	How "Condition Monitoring" differs from protection? Why "Condition Monitoring" is essential for large machines?	10
Q 2.	Discuss : environmental, mechanical and Electrical disturbances likely to be encounter by any electrical machines during its life .	10
Q 3.	Discuss in brief what is "mechanical aging" and "environmental aging" of electrical machines and what are the effects?	10

Q 4. Write short notes on :   5x2

    a)   Surface Tracking and Moisture absorption

    b)   Partial discharge

Q 5. Discuss in brief: 5x2

a) Induction machine faults

b) Stator end-winding faults

Q 6.	Discuss in brief, the different courses of maintenance actions and their relative advantages and disadvantages?	10
Q 7.	Define the following terms :	10

Availability, Failure rate , Reliability, Root cause , Failure mechanism,
FMEA; TBF; MTBF; TTF; TTR

BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING EXAMINATION, 2019

(4th Year, 2nd Semester)

CONDITION MONITORING OF ELECTRICAL SYSTEMS

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, show how insulation resistance can be measured in a typical setup.
   6

   b) How insulation resistance readings are interpreted? 5

   c) What are the factors that affect the insulation resistance readings during testing? 5

2. a) Explain (i) electronic polarization, (ii) ionic polarization, (iii) dipolar polarization and (iv) interfacial polarization. 10

   b) Derive a relationship to show power loss per unit volume of the dielectric depends on frequency, field intensity, and loss tangent. 6

3. a) Identify a method whereby an analysis can be performed from the dissolved gases 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 do you understand by the term Phase Resolved Partial Discharge (PRPD) pattern? With the help of a plot, illustrate a typical PRPD pattern. Show the difference of PRPD pattern in the case of (i) Noise, (ii) Surface discharge and (iii) Corona. Represent the shape of a typical partial discharge signal measured during experimental studies. 16