

**B. E. ELEC. ENGG. 4<sup>TH</sup> . YEAR 2<sup>ND</sup> SEMESTER EXAMINATION, 2018**

**(4<sup>th</sup> / 2<sup>nd</sup> Semester/Repeat/Supplementary/Annual/Bi-Annual)**

**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 for 50 marks

- |      |  |     |
|------|--|-----|
| Q 1. | What do you understand by the term "Condition Monitoring"? How does it differ from protection?               | 16  |
| Q 2. | Discuss : How machine specification is related to machine failure?   | 16  |
| Q 3. | Discuss in brief what is "environmental aging" of electrical machines and what are its effects?.             | 16  |
| Q 4. | Write short notes on (any two)   | 8x2 |
|      | a) Surface Tracking and Moisture absorption  |     |
|      | b) Thermal edging  |     |
|      | c) Cooling system failure  |     |
| Q 5. | Discuss in brief what are the common faults of large Induction Motors.                                       | 16  |
| Q 6. | Discuss in brief, what are the common faults of electrical machines and what are the effects ?               | 18  |
| Q 7. | Define the following terms :   | 6x3 |
|      | Availability; time of failure; time of repair; failure rate; time between failure; mean time between failure |     |

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**BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING EXAMINATION, 2018**

(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) Describe a typical test arrangement to measure the insulation resistance of an equipment. 6
- b) What are the factors that affect the insulation resistance readings during testing? 5
- c) Draw and explain the curve showing the components of current measured during DC testing of insulation. 5
  
2. a) Explain (i) dielectric absorption ratio and (ii) polarization index test related to maintenance strategies of equipment. What is the "One Megohm Rule"? 8
- b) Describe the "Step Voltage Test" in measuring the insulation resistance. Draw a typical curve associated with the Step Voltage Test. Explain a test curve showing a comparative result between a good and a bad insulation of equipment. 8
  
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. Describe with the help of a schematic how polarization and depolarization current (PDC) measurement can be performed on transformers. What is recovery voltage measurement? Explain the concept of recovery voltage spectra and central time constant. 16
  
5. How the monitoring of switchgears is done? What are the monitored parameters? Describe the recent development in the switchgear expert monitoring system highlighting the data collected. 16