

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), Nov. -Dec. 2016

B. Tech. In Electrical Engineering, Engineering, Semester VII

Roll No.....

COURSE CODE: EE703

Time: 3 hours

Max. Marks: 100

COURSE TITLE: Testing and Commissioning of Electrical Machine

Instructions to students:

1. Do not write anything other than your roll number on the question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. What is Marshalling Kiosk in power transformers
 - (a) It provides alarms, trips, controls and indications from main transformer
 - (b) It is the base on which transformer rail is provided to pull and push transformer
 - (c) It is the pressure device ruptures when the temperature inside transformer increases
 - (d) None of the above
- ii. Which of the following transformer insulating oil generally used in India?
 - (a) Paraffin based insulating oil
 - (b) Naphtha based insulating oil
 - (c) Aromatic based insulating oil
 - (d) Olefin based insulating oil
- iii. The ideal shape of the cross section of the core is
 - (a) Triangle
 - (b) circle
 - (c) rectangle
 - (d) pentagon
- iv. Mineral insulating oil is the most widely used for liquid insulation for
 - (a) Easy availability
 - (b) cheap
 - (c) Good electrical property as well as heat transfer
 - (d) all of the above
- v. Step potential and touch potential are associated with
 - (a) High voltage transmission
 - (b) Earthing of the substation
 - (c) Voltage rise in the substation
 - (d) Communication systems
- vi. Flash point of transformer insulating oil should be more than
 - (a) 40°C
 - (b) 140°C
 - (c) -40°C
 - (d) 100°C
- vii. Pre-commissioning tests are carried out on transformer for
 - (a) All of the options
 - (b) ratio test
 - (c) Vector group tests
 - (d) polarity tests

- viii. What is usually needed to test beakers
 (a) Timing Analyzer (b) $\mu\Omega$ - Meter (c) CB Supply (d) None
- ix. Cogging and crawling are phenomena associated with
 (a) Cage induction machines and they are essentially the same
 (b) The former during starting and the latter at a fraction of its rated speed
 (c) The former at a fraction of its rated speed and the latter during starting
 (d) Any of the above
- x. The excessive temperature rise in the transformer causes maximum damage to
 (a) Winding insulation (b) Core laminations
 (c) Copper wiring (d) Dielectric strength of the oil

Q.2 10

- i. Differentiate between equipment, earthing and system grounding
- ii. Describe various commissioning tests on electrical equipment/machines
- iii. Describe the planning before unloading of heavy electrical equipments at the site.
- iv. What is the leakage impedance voltage

Q.3A Describe the techniques used in drying of windings in induction motors 05

Q.3B What is polarization index? How can you measure the slip of induction motor? 05

Q.4A Explain the causes and remedies of unbalance input current in 3-phase Induction motor 05

Q.4B Explain meaning of insulation resistance. How is it measured for a power transformer. 05

Q.5A Explain the significance of temperature rise test and method to conduct a temperature rise test on the power transformer. 05

Q.5B State the methods of measurement of slip of induction motor. Also explain any one in detail. 05

Q.6A Define degree of protection of induction Motor. Explain I.P., and I.C. Codes for same. 05

Q.6B Explain noise measurement, vibration measurement and slip measurement in case of three phase induction motors. 05

OR

Q.6B Explain the pipe earthing and plate earthing and how to measure the earth resistance 05

Q.7A What is the difference between following tests on power transformers 05

(a) Type Test

- (b) Routine Test
- (c) Special Test
- (d) Commissioning Test

Q.7B A circuit breaker is rated 2500 A, 1500 MVA, 33 KV, 3 Sec, 3-phase oil circuit breaker. Determine (i) the rated normal current (ii) breaking current (iii) making current (iv) short time rating current. 05

OR

Q.7B Explain sweep frequency response analysis test for transformer 05

Q.8 A 20-kVA, 2200/220-V, 50-Hz distribution transformer is tested for efficiency and regulation as follows 10

O.C. Test: 220 V, 4.2 A, 148 W H.V. Side

S.C. Test: 86 V, 10.5 A, 360 W L.V. Side

Determine

- (a) Core loss
- (b) Equivalent resistance referred to primary
- (c) Equivalent resistance referred to primary
- (d) Regulation of transformer at 0.8 p.f. lagging current

Q.9A State the causes of vibration in motors and generators. Explain the harmful effects of vibration. How are the vibration measured. 10

Q.9B What is the significance of lightning impulse tests? Describe the test set-up and test procedure. 10

OR

Q.9B Discuss following short-circuit tests are conducted on circuit-breakers 10

- (1) Breaking capacity test
- (2) Making capacity
- (3) Duty cycle test
- (4) Short Time Current Test