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**PRESIDENCY UNIVERSITY
BENGALURU**

SET B

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024**

Semester : Semester III - 2022

Course Code : EEE2016

Course Name : Electrical Machines-I

Program : B.Tech.

Date : 0J-JAN-2024

Time : 9:30AM - 12:30 PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

4 X 5M = 20M

1. Mention the essential components of a DC Machine? Write the functions of Commutator in a DC Machine.
(CO1) [Knowledge]
2. Classify D C . motors with suitable diagrams
(CO2) [Knowledge]
3. Write the E.M.F. Equation of a Transformer . Also define the constant K with regard to 1 phaseTransformer
(CO3) [Knowledge]
4. List the necessary conditions that are required for the reliable parallel operation of Transformers
(CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

5 X 10M = 50M

5. It is noted that the DC shunt Generator was not building up voltage to its rated value. Propose the suggestions in order to solve the issues. Draw the relevant characteristics in order to explain the reasons.
(CO1) [Comprehension]
6. A 460-V series motor runs at 500 r.p.m. taking a current of 40 A. Calculate the speed and percentage change in torque if the load is reduced so that the motor is taking 30 A. Total resistance of the armature and field circuits is 0.8 Ω . Assume flux is proportional to the field current.
(CO2) [Comprehension]

7. Can we apply DC power to a Transformer? Justify your answer with reasons. What are the functions of No-load Current in a Transformer?
(CO3) [Comprehension]
8. a) One of the transformer in Δ / Δ connections is damaged and there is an emergency electric operation to be completed. As an expert in Power system operation how will you meet this situation?
(CO4) [Comprehension]
9. The secondary winding of the distribution transformer is connected in star. Give the reasons. What are the 4 common connections in 3 ph transformer applications. Draw the appropriate diagrams.
(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

2 X 15M = 30M

10. a) The induced emf in a DC Generator while running 600 rpm is 190 V. Calculate the induced emf when the machine runs at 1800 rpm? Specify the assumption you make to do this calculation?
b) A DC motor develops a torque of 20 N-m. Determine the torque when the armature current is increased by 40% and the flux is reduced by 5%.
(CO2) [Application]
11. A 50 kVA 2500 V/250 V single phase transformer has a primary winding resistance of 3Ω and a reactance of 5Ω . The secondary winding resistance and reactance are 0.02Ω and 0.03Ω respectively. Determine the equivalent resistance, reactance and Impedance as referred to primary winding. Also find total copper loss in the transformer.
(CO3) [Application]