



**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023**

Semester : Semester III - 2021

Course Code : EEE2016

Course Name : Sem III - EEE2016 - Electrical Machines-I

Program : B.Tech. Electrical and Electronics Engineering

Date : 18-JAN-2023

Time : 1.00PM - 4.00PM

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.

PART A

ANSWER ALL THE TEN QUESTIONS

10 X 2 = 20M

1. The magnetic flux in a d.c machine is produced by field coils carrying current. The production of magnetic flux in the device by circulating current in the field winding is called excitation. DC generators are categorized into types depending on the field excitation methods
a) 1 (CO1) [Knowledge]
b) 2
c) 3
d) 4
2. The field coils of the DC generator are usually made of
a) Mica (CO1) [Knowledge]
b) Copper
c) cast iron
d) Carbon
3. When a current carry conductor is placed in a magnetic field it experiences a force. The current in armature conductors of a dc machine is
a) Pure dc (CO1) [Knowledge]
b) pulsating dc
c) ac
d) pure dc and pulsating dc

4. According to Fleming's left-hand rule, when the forefinger points in the direction of the field or flux, the middle finger will point in the direction of
- a) current, in the conductor (CO1) [Knowledge]
 - b) movement of conductor
 - c) The resultant force on the conductor.
 - d) none of these answers
5. The working principle of dc generator is...
- a) Ohms Law (CO1) [Knowledge]
 - b) Lenz's Law
 - c) Faraday Induction Law
 - d) Lorentz force
6. If A is the number of parallel paths and P is the number of poles, then the number of the parallel path in lap winding and in wave winding is
- a) $A = P$, $A = 2$ (CO2) [Knowledge]
 - b) $A = 2P$, $A = P$
 - c) $A = 2$, $A = P$
 - d) $A = P$, $A = 2P$
7. In a self excited generator, if the series field opposes the shunt field, then the generator is
- a) Cumulatively compounded (CO2) [Knowledge]
 - b) Differentially compounded
 - c) Series generator
 - d) None of these
8. The purpose of laminating the core of a Transformer is
- a) In order to minimize eddy current loss. (CO3) [Knowledge]
 - b) In order to increase leakage flux
 - c) In order to reduce core material
 - d) In order to reduce hysteresis loss
9. What are the factors that affect Voltage Regulation of transformers
- a) Load current (CO3) [Knowledge]
 - b) Equivalent resistance
 - c) power factor
 - d) all the above
10. In a dc machine which of the following are the stationary parts
- a) Yoke & brushes (CO5,CO4) [Knowledge]
 - b) Armature core
 - c) commutator
 - d) shaft and armature winding

PART B

ANSWER ALL THE FOUR QUESTIONS

4 X 10 = 40M

11. Why Transformers are rated in kVA? Why Iron Losses are considered as constant losses in Transformer?
(CO1) [Comprehension]
12. 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 0.8Ω . Assume flux is proportional to the field current.
(CO2) [Comprehension]
13. What are the properties of Ideal Transformer? Why the efficiency of transformer is high compared to other machines.
(CO3) [Comprehension]
14. Discuss the procedure for conducting OC and SC tests on a single-phase transformer. What all the parameters can be found from these tests
(CO5,CO4) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS

2 X 20 = 40M

15. a) Draw the four most common connections in Three-Phase Transformer. What is the transformation ratio in 3 phase transformer?
b) The primary and secondary winding of a 20kVA, 6000V/250 V single phase transformer has primary winding & secondary winding resistances as 6Ω & 0.04Ω respectively. The total leakage reactance is 30Ω as referred to secondary winding. Find FL regulation at 0.9 pf lag
(CO2,CO3) [Application]
16. a) Draw the approximate equivalent circuit of a transformer referred to the primary side and find all parameters that you can find out from the same.
b) A 4 pole D C generator with wave wound armature has 51 slots each having 24 conductors. The flux per pole is 10 mWb. At what speed must the armature rotate to give an induced emf of 0.24 kV. What will be the voltage developed, if the winding is lap connected and the armature rotates at the same speed?
(CO5,CO4) [Application]
