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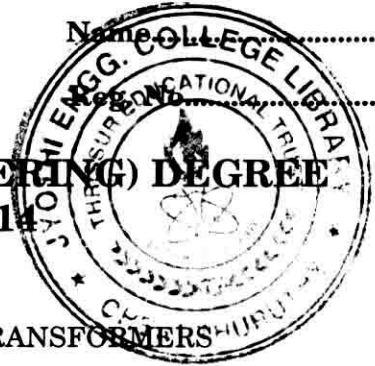
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Name.....

**FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, APRIL 2014**

(2009 Scheme)

EE 09 404/PTEE 09 403 – D.C. MACHINES AND TRANSFORMERS



Time : Three Hours

Maximum : 70 Marks

**Part A**

*All questions are compulsory.*

1. On what factors do hysteresis and eddy current loss depend ?
2. What are the different losses in a d.c. generator ?
3. How does a differentially compounded motor behave under high overload conditions ?
4. Why Swinburne's test cannot be performed on a d.c. series machine ?
5. Why is the transformer core built from thin stampings ?

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.*

6. What are equalizer rings? Where is it used?
7. What is reactance voltage in d.c. machines?
8. What are Interpoles? Explain the function of interpoles in d.c. machines.
9. Explain why d.c. series motor is always started on load.
10. Write note on solid state speed control in d.c. machines.
11. What are the conditions to be satisfied for parallel operation of single-phase transformers?
12. Derive the condition for maximum efficiency in a single-phase transformer.

(4 × 5 = 20 marks)

**Part C**

*Answer all questions.*

13. With neat sketch, explain the construction of a d.c. machine.

(10 marks)

Or

Turn over

14. (a) Derive the relation between m.m.f. reluctance and flux.  
(b) A coil of 300 turns and of resistance  $10 \Omega$  is wound uniformly over a steel ring of mean circumference 30 cm and cross-sectional area  $9 \text{ cm}^2$ . It is connected to a supply of 20 V d.c. If the relative permeability of the ring is 1500 find the magnetizing force, the reluctance, the m.m.f and the flux.

(4 + 6 = 10 marks)

15. Explain the different characteristics of a self excited d.c. generator.

(10 marks)

*Or*

16. A 4-pole generator supplies a current of 143 A. It has 492 conductors (i) Wave connected ; (ii) Lap connected. When delivering full load the brushes are given an actual lead of  $10^\circ$ . Calculate the demagnetising ampere turns per pole. The field winding is shunt connected and takes 10 A. Calculate the number of extra shunt field turns necessary to neutralize the demagnetisation.

(10 marks)

17. Explain the use of different types of d.c. motors with support of their characteristics.

(10 marks)

*Or*

18. Explain Hopkinson's test for determining the efficiency of a d.c. machine. Also explain the advantages and disadvantages of this method.

(10 marks)

19. Explain the construction of auto transformer. Derive the expression for saving of Cu in auto transformer. List its uses.

(10 marks)

*Or*

20. Describe in detail, the four phasor groups pertaining to three-phase transformers. Draw the phasor diagrams and connection schemes for each of these four groups.

(10 marks)

[4 × 10 = 40 marks]