PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 - 19 Examination

Semester: 7   Date: 10/05/2019
Subject Code: 03106403   Time: 10:30am to 01:00pm
Subject Name: Transformer & DC Machine Design   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1   Objective Type Questions - **(All are compulsory) (Each of one mark)**   **(15)**
1. The total flux around the armature periphery is known as _____.
2. Dummy coils are used in _____ type of winding.

3. Equalizer connections are used in _____ type of winding.

4. For transformer the ratio of copper area in the window to the total window area is called _____.
5. In transformer the cylindrical windings with rectangular conductors are used for voltages up-to _____ V.
6. In dc machine, use of inter-poles improves _____.

7. In high voltage machines, space occupied by insulation is _____.

8. In dc machine, compensating windings are used to neutralize the effect of _____.
9. Higher value of specific electrical loading results in a higher temperature rise of winding. State True or False.
10. In transformer maximum efficiency is obtained when variable losses are equal to the constant losses. State True or False.
11. Volume of active parts of rotating machine _____ with increase in speed of   machine.
    a) decreases   c) remains same
    b) increases   d) None of above
12. When the coil span is less than pole pitch, then such coil is called _____ coil.
    a) Short pitched   c) dummy coil
    b) Full pitched   d) None of above
13. Efficiency of transformer ranges from _____to _____%.
    a) 85 to 90 %   c) 90 to 95 %
    b) 95 to 99.5 %   d) 80 to 85 %
14. Tappings are provided on HV winding in transformer. State True or False.

15. Frequency of flux reversals will increase with increase in number of poles. State True or False.

Q.2 Answer the following questions. **(Attempt any three)** **(15)**

    A) Define following terms with respect to rotating electrical machine:
       (i) Peripheral speed (ii) Electrical Loading (iii) Specific Magnetic Loading (iv) Specific Electrical Loading (v) Slot Pitch.

    B) Prove that in dc machine the volume of active parts is proportional to torque of machine.

    C) Define following terms related to dc armature winding:
       (i) Front Pitch (ii) Back Pitch (iii) Winding Pitch (iv) Commutator Pitch (v) Pole Pitch

    D) Explain with proper reasons that why L.V winding is placed nearer to core and H.V winding is kept outside.

Q.3 A) Derive the output equation of DC machine. **(07)**

    B) Explain the factors responsible for deciding length of airgap for dc machine. **(08)**

<div align="center">OR</div>

    B) Explain in brief factors that are to be considered while selecting number of poles for DC machine **(08)**

Q.4 A) Derive $Q = 2.22 f B_m \delta K_w A_w A_i . 10^{-3}$ kVA for single phase transformer. **(07)**

<div align="center">OR</div>

    A) For transformer describe design steps for HV winding design. **(07)**

    B) Explain different types of cooling methods for transformer. **(08)**