PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING

TEST - 1

Even Semester: 2018-19   **Date**: 05 March 2019

Course Code: EEE 208   **Time**: 1 Hour

Course Name: Electrical Machines-I   **Max Marks**: 40

Programme & Sem: B.Tech (EEE) & IV Sem   **Weightage**: 20%

Instructions:
  i.   *Read the question properly and answer accordingly.*
  ii. *Question paper consists of 3 parts.*
  iii. *Scientific and Non-programmable calculators are permitted.*

Part A

Answer **all** the Questions. **Each** question carries **four** marks.   (3Qx4M=12)

1. Select the appropriate answer for the following questions;   (1x4=4 Marks)

   a. The armature conductors of a 6-pole, lap wound DC Generator are having ----- number of parallel paths

         i. 4.   ii. 6.   iii. 3.   iv. 2.

   b. The EMF generated by a given DC generator depends upon

      i. Flux only.   ii. Speed only.   iii. Flux and speed.   iv. None of the above.

   c. A six-pole lap wound armature has 840 conductors and flux per pole of 0.018 wb. The emf generated is ------- Volts, when the machine is running at 600rpm.

      i. 151.2.   ii. 151.0.   iii. 15.12.   iv. 1.512.

   d. The brush voltage drops in a DC machine is in the order of

      i. 2 V.   ii. 32 V.   iii. 20 V.   iv. 40 V.

2. Fill in the blanks of the following;   (1x4=4 Marks)

   a. The armature core of a DC machine is laminated to--------------

   b. The armature torque of a dc motor is a function of its _____

   c. The cross sectional area of pole shoe is more than the pole core because ------------

   d. In a dc machine the armature mmf is directed along----

3. Explain the terms Critical Field Resistance and critical speed in a D.C Shunt Generator.

                                                                          (04 Marks)

Part B

Answer **all** the Questions. **Each** question carries **eight** marks.   (2Qx8M=16)

4. **a.** A 4-Pole DC long shunt lap wound generator supplies 25KW at terminal voltage of 500 V. The armature resistance is 0.03 Ω series field resistance is 0.04 Ω and shunt field resistance is 200 Ω. The brush drop may be taken as 1V/brush. Identify the unknown values and compute the same, if the speed machine is 1200 rpm and the flux per pole is 0.02 weber. Neglect the armature reaction.   (05 Marks)

b. What are the essential conditions to build up voltage in a DC Generator?   (03 Marks)

5. **a.** An 8 pole generator has an output of 200 A at 500 V. The lap connected armature has 1280 conductors, 160 commutator segments. If the brushes are advanced 4 segments from the neutral axis estimate the armature demagnetizing ampere turns/pole   (04 Marks)

b. State the reasons for the droop in terminal voltage of a shunt generator when it is loaded   (04 Marks)

Part C

Answer **all** the Questions. **Each** question carries **six** marks.   (2Qx6M=12)

6. Draw the pictorial view of a D.C. Generator and label all the parts.

7. Explain armature reaction and its effects in brief .Draw the relevant diagrams
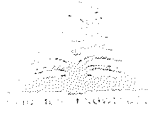
SCHOOL OF ENGINEERING

TEST - 2

Even Semester: 2018-19

Course Code: EEE 208

Course Name: Electrical Machines-I

Program & Sem: B.Tech & IV Sem

Date: 15 April 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:
  i.   Read the question properly and answer accordingly.
  ii. Question paper consists of 3 parts.
  iii. Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **four** marks.   (3Qx4M=12)

1. Select the appropriate answer for the following questions;   (1x4=4 Marks)

   i.   When the speed of D.C motor is increased
        a. Back E.M.F increases and current drawn decreases.
        b. Back E.M.F decreases and current drawn increases
        c. Back E.M.F and current drawn both increases
        d. Back E.M.F and current drawn both decreases

   ii   A three point starter is suitable for
        a. D C Shunt Motor
        b. D C Series Motor
        c. Both a & b
        d. D C Shunt, Series, and compound motor

   iii If Ta be the armature torque and Ia be the armature current then which of the following relation is valid for DC series motor before saturation?
        a. $Ta \propto Ia$
        b. $Ta \propto Ia^2$
        c. $Ta \propto 1/Ia$
        d. $Ta \propto 1/Ia^2$

   iv. Which part of DC motor can sustain maximum temperature rise?
        a. Armature Winding
        b. Field winding
        c. Slip Ring
        d. Commutator

2. With reasons state whether the following statements are **True or False**;   (04 Marks)

   i. Swinburne's test is not applicable for D C series machine.

   ii. If a shunt motor is started with its field winding open then it will rotate at dangerously high speed.

   iii. A series DC motor may be connected as a shunt motor, and a shunt motor may be connected as a series motor, if necessary.

3. Draw the torque-armature current characteristics & Speed-Torque characteristics of DC Series motor. Write the relevant equations.   (04-Marks)

Answer both the Questions. Each question carries **eight** marks. (2Qx8M=16)

4. A DC Shunt motor with armature circuit resistance of 0.1 Ohm, runs at 1600 rpm, while taking an armature current of 100 amps, from 230 volts DC sources. The friction and windage loss is 300 Watts, no-load core losses are 1200 Watts and the total I^2R loss is 2500 Watts, stray load loss equal 1.0% of the output. Estimate the motor efficiency.

(08-Marks)

5. a. Describe the Swinburne's Test for D C shunt machines indicating how the efficiency of the machine at full load is determined. (06-Marks)

   b. Why starters is necessary for a DC motor? (02-Marks)

Part C

Answer the Question. The Question carries **twelve** marks. (1Qx12M=12)

6. a. The following readings are obtained when doing load test on DC shunt motor using a brake drum spring balance reading= 10 Kg & 35 Kg.

   Diameter of the drum=40 cm.

   Speed of the motor =950 rpm.

   Applied voltage =200 Volts.

   Line Current =30 Amps.

   Estimate the torque developed by motor, output power of the motor and the efficiency of the motor. (06-Marks)

   b. Explain with necessary diagrams the flux control method for speed of a DC shunt motor.

(06-Marks)