Code No: NR/RR210205 | NR/RR | Set No. 2

II B.Tech I Semester Examinations,November 2010
ELECTRO MECHANICS - I
Electrical And Electronics Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the purpose of laminating the armature core of a d. c. machine.
   (b) The diameter of a commutator ring of a lap wound d. c. motor is 25 cms. The brush width is 1.8 cm and width of mica insulation is 0.2 cm. If the speed of the motor is 200 rpm, determine the time of commutation. [6+10]

2. (a) Describe any one laboratory test procedure to separate the losses in a DC machine?
   (b) In a DC machine the total iron loss at the rated speed and excitation is 9KW on keeping excitation unaltered but reducing speed by 30%, the total iron loss was found to be 5KW. Calculate hysterisis and eddy current losses at
      i. full speed; and
      ii. half the rated speed with the same excitation. [8+8]

3. (a) Develop the general expression for the speed of a motor in terms of supply voltage, armature resistance and flux per pole.
   (b) Discuss the applications of series motors and compound motors. [8+8]

4. (a) Write a note on series-parallel Speed Control method of D.C. Series Motors.
   (b) A 4 pole, 250V, d.c. series motor has a wave wound armature with 496 conductors. Calculate:
      i. The gross torque
      ii. The speed
      iii. The output torque
      iv. The efficiency, if the motor current is 50A
      v. The value of flux per pole under these conditions is 22 mwb and the corresponding iron, friction and vintage losses totaling 810 w. Armature resistane = 0.19Ω field resistance = 0.14Ω [8+8]

5. (a) Explain the principle of action of commutator in a d. c. generator.
   (b) Define
      i. front pitch
      ii. back pitch
      iii. coil span and
      iv. commutator pitch as applied to d. c. armature windings and indicate the above on the diagram of a wave winding. [8+8]

6. A 250V, 50KW shunt generator has 1000 turns on each pole of its field winding. On no load a current of 3.5A in the field winding produces a terminal voltage of 250V, but on full load the shunt current has to be increased to 5A for the same terminal voltage at the same speed. Calculate number of series field turns per pole required for level compounding. [16]

7. (a) Why is a starter necessary for a dc motor? What is the difference between 3 point and 4 point starters?

   (b) Calculate the values of resistance elements for a 6-stud starter. The maximum current at starting is not to exceed 20A for a 200V shunt motor. The armature resistance is 0.5Ω. What is the value of minimum current? [8+8]

8. Obtain an expression for torque of a reluctance motor shown in the figure3 in terms of direct axis and quadranture axis reactances. [16]

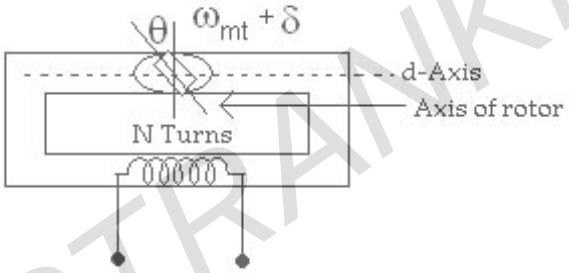

Figure 3

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ELECTRO MECHANICS - I
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2. (a) Write a note on series-parallel Speed Control method of D.C. Series Motors.
   (b) A 4 pole, 250V, d.c. series motor has a wave wound armature with 496 conductors. Calculate:
      i. The gross torque
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4. (a) Develop the general expression for the speed of a motor in terms of supply voltage, armature resistance and flux per pole.
   (b) Discuss the applications of series motors and compound motors. [8+8]

5. (a) Explain the purpose of laminating the armature core of a d. c. machine.
   (b) The diameter of a commutator ring of a lap wound d. c. motor is 25 cms. The brush width is 1.8 cm and width of mica insulation is 0.2 cm. If the speed of the motor is 200 rpm, determine the time of commutation. [6+10]

6. (a) Describe any one laboratory test procedure to separate the losses in a DC machine?

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(b) In a DC machine the total iron loss at the rated speed and excitation is 9KW on keeping excitation unaltered but reducing speed by 30%, the total iron loss was found to be 5KW. Calculate hysterisis and eddy current losses at

i. full speed; and

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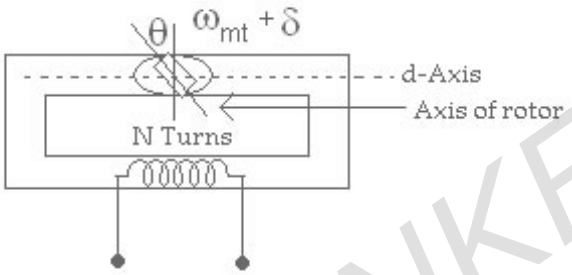

Figure 3

8. (a) Why is a starter necessary for a dc motor? What is the difference between 3 point and 4 point starters?

(b) Calculate the values of resistance elements for a 6-stud starter. The maximum current at starting is not to exceed 20A for a 200V shunt motor. The armature resistance is 0.5Ω. What is the value of minimum current? [8+8]

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Code No: NR/RR210205 | NR/RR | Set No. 1

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ELECTRO MECHANICS - I
Electrical And Electronics Engineering

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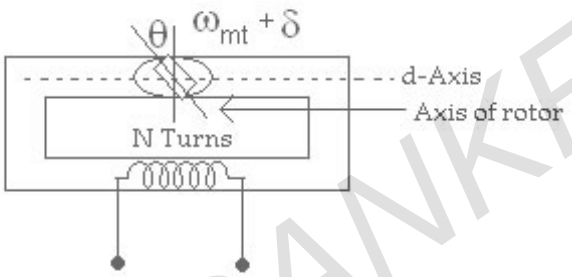

Figure 3

2. (a) Develop the general expression for the speed of a motor in terms of supply voltage, armature resistance and flux per pole.
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3. (a) Write a note on series-parallel Speed Control method of D.C. Series Motors.
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Electrical And Electronics Engineering

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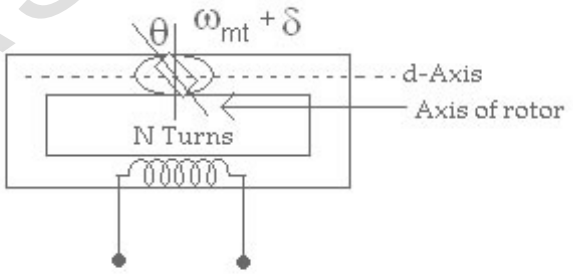

Figure 3

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