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SE-8127

B. E. - II (Sem. - III) (Mech.) Examination

May / June – 2011

Electrical Machines & Electronics

(New Course)

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 2 (SEM. - 3) (MECH.)**

Name of the Subject :

☛ **ELECTRICAL MACHINES & ELECTRONICS (NEW)**

☛Subject Code No. : **8 1 2 7** ☛Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) All questions are **compulsory**.

(3) Draw figures wherever necessary and make necessary assumptions wherever required.

(4) Figures to the **right** indicate full marks.

1 (a) The maximum flux density in the core of a 250/3000 Volts, 50 Hz, 1-ϕ transformer is 1.2 wb/m^2. If the emf per turn is 8 Volt. Determine **3**

(i) Secondary turns and primary turns

(ii) Area of the core_____

(b) Explain parallel operation of alternator _____. **6**

(c) Write the difference between core type transformer and shell type transformer. **5**

(d) Derive the expression for the torque developed in D.C. motor. **4**

2 Answer the following : **16**

(a) Explain the construction of 1-ϕ transformer. **4**

OR

(a) Explain the operating principle of a 3-ϕ induction motor. **4**

(b) Discuss the method of speed control for D.C. Motor. 4

OR

(b) Explain the characteristics of D.C. generator. 4

(c) A 200 V d.c. shunt motor takes 4 Amp. at no load when running at 700 Rpm. The field resistance is 100 Ω. The resistance of armature at standstill gives a drop of 6 volts across armature terminals when 10 Amp were passed through it calculate 8

(i) Speed on load

(ii) Torque in (mm)

(iii) Efficiency

The normal input of motor is 8 kw.

3 Answer the following : **16**

(i) Write the comparison between outdoor and indoor substation. 4

(ii) Draw and explain typical A.C. power supply scheme in detail. 8

(iii) In a 120 V compound generator, the resistance of armature, shunt and series winding are 0.06 Ω, 25 Ω and 0.04 Ω respectively. The load current is 100 A at 120 V. Find the induced emf and the armature current when the machine is connected as long shunt. 4

OR

3 Answer the following : **16**

(i) Write short note on Star-Delta starter for 3-ϕ induction motor. **5**

(ii) What are the drawbacks of low power factor ? Explain any one method of power factor improvement. **6**

(iii) Explain NAND Gate is called as universal gate. **5**

4 Answer the following : **20**

(a) Answer in short (each **two** mark) **12**

(i) Define : Turns Ratio

(ii) What are the function of commutator ?

(iii) Write emf equation of transformer.

(iv) State : Difference between D.C. Generator and alternator.

(v) Classify : D.C. Motors

(vi) Enlist : application of 3-ϕ induction motor.

(b) Explain three types of tariff in detail with their drawbacks. 8

5 (a) Compare A.C. and D.C. transmission system. 7

(b) A 4 pole lap wound, d.c. shunt generator has useful flux per pole of 0.07 wb. The armature wdg. consist of 220 turns each of 0.004 Ω resi. calculate the terminal voltage when running at 900 rpm. If the armature current is 50 A. 8

OR

5 (a) Explain capacitor start induction run 1-ϕ induction motor in detail. 8

(b) Explain open circuit test and short circuit test of transformer. 7

6 Attempt any **three** : 15

(i) Write short note : losses in Alternator

(ii) Draw block diagram of 8085 microprocessor.

(iii) State and explain Boolean laws.

(iv) Explain pole mounted substation.

(v) Explain AND, OR, NOT, NOR, NAND logic gates with their truth table.