* U H - 8 1 2 7 *

# UH-8127

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

**May / June – 2012**

## 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 And Electronics (New Course)

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

Seat No. :

Student's Signature

(2) Attempt all questions.
(3) Assume suitable data if required.
(4) Support your answers with neat sketches.
(5) Figures to the right indicate max. marks.

**1** (a) Define and state working principle of following terms : **3**
(i) transformer
(ii) DC generator

(b) Derive the EMF equation of DC machine. **3**

(c) What is the function of starter in DC machine and state the types of starter used in DC machine ? **2**

(d) Which type of losses occurs in transformers ? **2**

(e) What is the principle of 3-phase induction motor ? Explain in detail. **6**

(f) State the reason which cause the terminal voltage under load condition to be different from the terminal voltage under no load condition for **4**
(i) separately excited generator
(ii) shunt generator

**2** (a) Draw and explain characteristic of DC series and shunt motor. **6**

(b) Prove the condition for maximum torque of 3-phase induction motor. **6**

**OR**

2 (a) Prove the condition for maximum efficiency of the transformer. **6**

(b) Explain the rotating magnetic field of 3-phase induction motor in brief. **6**

3 Attempt any three of the following : **18**

(a) Why single phase induction motor is not self starting motor ? Give reason. Explain double field revolving theory for the same motor.

(b) Explain different method of speed control of three phase induction motor.

(c) What is the voltage regulation of an alternator ? Explain cynchronouse impedance method.

(d) Draw the power stage of DC generator and DC motor and also derive torque equation of DC machine.

(e) Write the comparison of the three phase and single phase induction motor and explain universal motor.

4 (a) Define following terms : **10**

(i) Induction motor clip

(ii) Tariff

(iii) Transformer substation

(iv) Diode and transistor.

(v) Stack pointer

(b) State the comparison of DC and AC transmission line. **5**

(c) Explain the importance of power factor improvement. **5**

5 (a) Write and explain the name of equipment used in substation with symbols. **5**

(b) Find the most economical power factor, when tariff is Rs. 80% per KVA of maximum demand plus a flat rate per kwh. Assume additional cost of condenser of Rs. 60% per KVA. Rate of interest and depreciation is together to be taken as 10%. **5**

(c) State Ideal Characteristic of an OP-AMP. **5**

**OR**

5 (a) Explain single stage CE amplifier with neat circuit diagram. **5**

(b) What is rectification ? With the help of neat circuit diagram and wave form explain the operation of full wave rectifier. **10**

**6** Attempt any three : **15**

(i) State and explain De-Morgan's theorem and draw truth table for NAND, NOR, and OR gate.

(ii) Draw and explain Internal architecture of 8085.

(iii) Explain star-delta and star-star connection of three phase transformer in brief.

(iv) Explain instrument transformer in brief.

(v) Explain disadvantages of poor power factor in brief.

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