EE5T5

Reg. No. ☐☐☐☐☐☐☐☐☐

Fifth Semester B.E. Degree Examination, July/August 2002

Electrical & Electronics Engineering

Electrical Drawing & CAD

Time: 4 hrs.]

[Max.Marks : 100

Note: 1. Answer FOUR full questions choosing THREE questions from questions 1 to 6 and ONE question from 7 and 8.

2. Assume any missing data suitably.

1. (a) Sketch the electrical representation of the following:

   a) Separately excited generator.

   b) Single phase auto transformer.

   c) CT & PT.

   d) Isolator & circuit breaker.

                                                       ($4 \times 2 = 8$ Marks)

  (b) Draw a typical layout of

   i) Hydel power plant &

   ii) Nuclear power plant.

                                               ($2 \times 6 = 12$ Marks)

2. (a) Sketch the typical layout of a transmission & distribution system indicating the usual voltage levels at the primary & secondary transmission as well as at the primary & secondary distribution.

                                               (10 Marks)

  (b) Draw the single line diagram of a typical substation indicating the positions of all the necessary equipments.

                                               (10 Marks)

3. (a) Draw the developed winding diagram for a 4 pole 13 slots simplex double layer wave connected DC generator indicating the positions of the brushes. Write the winding table and also draw the sequence diagram. (20 Marks)

4.   Draw the developed lap winding diagram for a 3ϕ star connected 4 pole machine. The winding is to be arranged in double layer with $2\frac{1}{2}$ slots/pole/phase in the phase sequence RYB.

                                               (20 Marks)

5.   Draw a schematic diagram of

   a) DOL starter with all the details.

   b) Auto transformer starter with no volt coil and overload release.

                                             ($2 \times 10 = 20$ Marks)

6.   Draw proportionate sketches of the following:

   a) Brush & brush holder.

   b) Sectional plan of a limb with winding details of a 3ϕ transformer having 3 stepped core.

   c) Sectional end view of method of fixing the pole to the yoke in a DC machine.

                                           ($6+7+7 = 20$ Marks)

7.   Draw to a suitable scale half sectional end view and half sectional longitudinal view of a 4 pole DC shunt motor having the following dimensions.

i) Armature:

-Outside diameter = 18.5cms
length = 13.5cms
No. of slots = 24.

ii) Mainpole (Laminated)

Total height = 11cms
Width = 7cms
Pole arc = 10cms
length of the pole = 14cms
Airgap = 0.5cms.

iii) Inter pole (solid)

Size = 2× 10.8 cms.
length = 11cms.

iv) Commutator:

Diameter = 13cms
length = 10cms.   (40 Marks)

8. (a) Draw a half sectional elevation of a salient pole alternator. Show the stator and rotor with winding and their method of fixing.

   i) Length of the stator = 19cms

   ii) Inside diameter of the stator = 32cms

   iii) Outside diameter of the stator = 51cms

   iv) length of the yoke = 24cms

   v) overall height of the machine = 61cms

   vi) overall length of the machine = 50cms.   (20 Marks)

(b) Draw the half sectional end view of a squirrel cage motor with the following dimensions.

   i) Inside diameter of the stator = 20cms.

   ii) length of the stator = 14cms

   iii) stator slot size = 0.95 × 2.9cms

   iv) No. of slots = 36

   v) Outside diameter of the stator = 34cms

   vi) No. of rotor slots = 31 with 1cm dia

   vii) Diameter of the shaft below rotor = 2.5cms.   (20 Marks)

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Fifth Semester B.E. Degree Examination, January/February 2005

Electrical & Electronics Engineering

(Old Scheme)

Electrical Drawing & CAD

Time: 4 hrs.]

[Max.Marks : 100

Note: 1. *Answer FOUR full questions choosing THREE questions from questions 1 to 6 and ONE question from 7 and 8.*
2. *Assume any missing data suitably.*

1. (a) Sketch the standard symbols for the following electrical equipments.

    i)   3 phase slip ring induction motor

    ii) 3 phase auto transformer

    iii) Circuit breaker and isolator

    iv) D.C. compound generator

    v) Potential transformer.   **(10 Marks)**

  (b) Draw the single line diagram of a typical power system.   **(10 Marks)**

2. (a) Draw the single line diagram of a 33/6.6 kV substation indicating the positions of isolators, circuit breakers, lightning arrestors, transformer and other necessary equipments.   **(10 Marks)**

  (b) Draw the layout and schematic arrangement of Nuclear power plant.
                                                          (10 Marks)

3.   Draw the developed winding diagram of a D.C. generator with 4 pole 16, slots, double layer, duplex progressive lap winding. Show the positions of poles, direction of induced emf and position of brushes.   **(20 Marks)**

4.   Draw the developed winding diagram for a 4 pole, 3 phase synchronous machine with double layer with 3 slots/pole/phase and short chorded by ONE slot. The phase sequence is RYB. Connect the winding in Delta.
                                                          (20 Marks)

5. (a) Draw a neat layout of a thermal power plant.   **(10 Marks)**

  (b) Draw the schematic diagram of a direct on line (D.O.L) starter showing all the details.   **(10 Marks)**

6.   Draw end view and elevation of the stator stamping of an induction motor of the given below dimensions.

    Inside or airgap diameter of stator stamping = 18cm
    Slot size = 2.9 × 0.95cm
    Depth of iron behind the stator slot = 4cm
    Length of stator stamping = 13.5cm
    One radial cooling duct = 1cm wide
    Total slots = 36   **(20 Marks)**

7.   Draw the following views of a 3 phase, 250 KVA, 11KV/400V transformer

      i)   Front elevation full in section

      ii)   Plan full in section

    The detailed dimensions of the parts are as follows :

    <u>CORE</u>

        Cross section of the core = 3 step core
        Diameter of circumscribing circle = 24 cm
        Distance between the adjacent centres of core = 42.5cm

    <u>YOKE</u>

        Yoke height = 25cm

    <u>LT Winding</u>

        Outside diameter of L.T. coil = 28.3 cm
        Inside diameter of L.T. coil = 25 cm
        Height of LT winding = 43.5 cm
        Number of turns per phase = 12

    <u>H.T. Winding</u>

        Outside diameter of H.T. coil = 41.5 cm
        Inside diameter of H.T. coil = 34.3 cm
        Height of HT winding = 43.5cm
        Number of turns/phase = 572

    Total height of the transformer = 100cm. Other missing data may be assumed.

                                                    (40 Marks)

8.   Draw to a suitable scale a neat and sectional end view of a DC machine as per main dimensions given below in centimetre scale. Winding of field and armature need not be shown.

        D.C. 6 pole, 150 HP motor
        Armature diameter = 55
        Number of slots = 61
        Size of slot = 1 × 4.5
        Slot open type.
        Depth below slot = 9
        Commutator diameter = 42
        Number of commutator bars = 244
        Air gap length (radial) = 0.5 at main pole and 0.6 at inter pole
        Main pole laminated, breadth 14, arc 20, height with shoe 21.
        Interpole breadth = 4
        Outside diameter of yoke = 115
        Shaft diameter at bearing = 10

    The method of fixing the pole lamination and the pole to the yoke should be clearly shown.   **(40 Marks)**

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