

G 824

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Eighth Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL SYSTEM DESIGN (E)

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 Admissions]



Maximum : 100 Marks

Time : Three Hours

Part A

*Answer all questions briefly.
Each question carries 4 marks.*

1. Derive the output equation of a DC machine.
2. What are the factors to be considered for the choice of number : of armature slots in a DC machine.
3. What is the basis for providing cooling tubes in a transformer.
4. Explain the procedure to arrive at the overall dimensions of a transformer.
5. What is runaway speed ? What is its significance with respect to turbo alternators ?
6. How will you estimate the air gap length in a synchronous machine.
7. Give the guideline to estimate the cost involved in electrical wiring installation of residential building.
8. What are the factors considered for the choice of wiring system.
9. Write a note on comparison between indoor and outdoor substations.
10. Explain pipe Earthing.

(10 × 4 = 40 marks)

Part B

*Answer all questions.
Each question carries 12 marks.*

11. Find the main dimensions and number of poles of a 50 hp, 230 V, 1400 r.p.m. d.c shunt motor for a square pole face. Average gap density is 0.5 Wb/m^2 , amp. conductors per meter is 22000. Pole arc/pole pitch ratio is 0.7. Assume efficiency is 0.90.

Or

12. Explain the design procedure for the field system of a D.C. machine.

Turn over

13. Obtain the optimum design of a transformer from the point of a view (i) minimum cost ; (ii) minimum loss.

Or

14. Determine the dimensions for core and yoke of a 5kVA, 50 Hz single phase core type transformer. A rectangular core is used with long side twice as long as stout side. Window height is 3 times the width. Volt/turn = 1.8 V window space factor is 0.2, current density is 1.8A/mm² flux density= 1 Wb/m².
15. A 1250 kVA, 3 phase 6600 V, salient pole alternator has the following data :
- Diameter of air gap = 1.6 m
 - Length of core = 0.45 m
 - Number of poles = 20
 - Armature amp. conductors /m = 28000
 - Pole arc /pole pitch = 0.68
 - Stator pole pitch = 28 mm

Design a suitable damper winding for the machine.

Or

16. What are (i) the factors to be considered for selection of armature slots in an alternator (ii) ~~The different method for elimination of harmonics is synchronous machines.~~
17. Estimate the quantity of materials required for providing an electrical installation in an office room having 15 m × 10 m × 4m which requires three ceiling fans, three tube lights and a power plug in surface conduit system of wiring.

Or

18. Estimate the quantity of material required for wiring the residential building whose plan is given below. Assume concealed conduit wiring. Height of ceiling is 4m . Load in each is as follows :
- Hall-light point - 1, socket outlet - 1 bedroom - light point - 1, fan point - 1, socket outlet - 1
- Kitchen - light point - 1, socket outlet - 1

Kitchen 5 m × 3m	
Hall 4 m × 2.5 m	Bedroom 4 m × 2.5 m



19. Draw the layout of outdoor 11kV transformer station with all accessories.

Or

20. Estimate the power supply arrangement for a bulk industrial consumer.

[5 × 12 = 60 marks]