3474

BOARD DIPLOMA EXAMINATION, (C-09)
OCTOBER/NOVEMBER-2018
DEEE - FOURTH SEMESTER EXAMINATION

AC MACHINES – I

Time : 3 Hours]   [Total Marks: 80

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PART-A

3X10=30

Instructions   :   1. Answer **All** questions.
2. Each question carries **three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. State the principle of working of a transformer.

2. Define all day efficiency.

3. What are the effects of leakage reaction of transformer windings?

4. Write any three cooling methods of a transformer.

5. State the necessity of instrument transformers.

6. List any three applications of auto transformers.

7. Write the effect of armature reaction of alternator for unity P.F. load.

8. Compare salient pole type rotor with cylindrical type rotor in any three aspects.

9. Define distribution factor of synchronous generator.

10. Write the necessity for parallel operation of alternators.

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PART-B

10X5=50

Instructions :   1. Answer any **Five** questions.
                               2. Each question carries **ten** marks.

11. (a) Derive E.M.F. equation of single phase transformer.

    (b) A single phase 600/230 V, 50 HZ transformer has a core area of 400 cm^2 and a maximum flux density of 1.18 wb/m^2, calculate the number of turns in primary and secondary windings.

12. (a) Derive the condition for maximum efficiency of a transformer.

    (b) Write the differences between distribution transformers and power transformer.

13. Two single phase transformers with an equal voltage ratio are running in parallel and supplying a load of 25kW at 0.8 p.f. lag. The equivalent impedances of the transformers as referred to secondary are $(0.5+j4)\Omega$ and $(0.7+j9)\Omega$. Find the load shared by each transformer.

14. A 20 KVA, 2500/500V, single phase transformer has the following parameters:

    H.V winding :   L.V. Winding

    (i) $r_1 = 8\Omega$ $r_2 = 0.3\Omega$

    (ii) $x_1 = 1.7\Omega$ $x_2 = 0.7\Omega$

    Find the voltage regulation and secondary terminal voltage at full load for a power factor of   (a) 0.8 lag   (b) 0.8 lead

15. (a) (i) Draw the connection diagram of delta-star configuration of 3 phase transformer

        (ii) Draw the connection diagram of delta-delta configuration of 3 phase transformer.

    (b) Explain about open-delta connection of 3-phaset transformer with a neat figure.

16. Explain with neat diagrams the procedure to conduct open circuit test and short circuit test on three phase alternator.

17. A 100 KVA, 220V, 50HZ 3-ϕ alternator has effective armature resistance of 0.015Ω and an armature leakage reactance of 0.06Ω. Computer the voltage induced in the armature winding when the alternator is delivering rated current at a load PF of

        (a) Unity   (b) 0.8 lag

18. Two AC generators running in parallel supply lighting load of 2000 KW and a motor load of 4000KW at a PF of 0.8 lagging. One machine is loaded to 2400 KW at 0.95P.F. lagging. What is the KW output and PF of the second machine?

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