# **4462**

## **BOARD DIPLOMA EXAMINATION, (C-14)**
## **MARCH/APRIL-2019**
## **DEEE - FOURTH SEMESTER EXAMINATION**

### A.C. MACHINES – I

Time: 3 Hours]                                                                 [Max. Marks: 80

### **PART-A**

**10x3=30M**

**Instructions:**   1) Answer **all** questions. Each question carries **Three** marks.
2) Answers should be brief and shall not exceed five simple sentences.

1)   Distinguish between core type and shell type transformers in any three aspects.

2)   Write the conditions for parallel operation of the single phase transformers.

3)   What are the effects of winding leakage reactance of a transformer?

4)   Compare ideal transformer with practical transformer.

5)   List the advantages of 3-phase transformer over 1-phase transformer?

6)   Write the function of (a) Conservator (b) Explosion vent

7)   Compare salient pole type rotor with cylindrical rotor in any three apects.

8)   Define

(a) Pitch factor  (b) Distribution factor of a synchronous generator.

9)   What are the factors that cause a change of alternator terminal voltage on load?

10)   What will be the effect of change in input supply to an alternator connected in parallel?

**5x10=50M**

***Instructions:*** 1) Answer any **five** questions.
2) Each question carries **ten** marks.
3) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11) Explain the operation of transformer with the help of vector diagram on   i) No- Load    ii) Load at lagging  p.f

12) (a) Derive the e.m.f equation of  1-phase power transformer.

(b) The no- load current of a transformer is 5A at 0.2 power factor lag when supplied at 230V, 50Hz. The number of turns on the primary winding is 100.

Calculate (i) maximum value of flux in the core  (ii) core loss

(iii) magnetising current.  (Internal drops in the windings are to be ignored)

13) (a) Derive the condition for maximum efficiency of a Transformer    4M

(b) The efficiency of a 300KVA, 1-phase transformer  is 98% when delivering full load at 0.8 p.f lag and 99% at half load and unity power factor.  Calculate (a) the iron loss,   (b) the full load copper loss.                                                                                        6M

14) (a) Find the all day efficiency of a 100kVA distribution transformer having full load efficiency of 94% and full load copper losse are equal to the constant iron losses. The loading of the transformer is as follows with unity power factor

(i) No load for 6 hours        (ii)  Half load for 10 hours.

(iii) 25% load for 5hours.    (iv) Full load for 3hours.        6M

(b) Differentitate between distribution transformer and power transformer.                                                                                     4M

15) (a) Explain the saving of copper in auto transformer when compared with two winding transformer.

(b) Explain the open delta connection with a neat sketch.

16) What is armature reaction? Explain the armature reaction of an alternator at upf, lagging p.f. and leading p.f. with diagram.

17) a)  Define voltage regulation of an alternator                             3M

    b)  A 3-phas star connected alternator is rated as 1200 KVA, 11000 V. The armature effective resistance and synchronous reactance are $1.2\ \Omega$ and $20\Omega$ respecively per phase. Calculate the percentage regulation for a load of 1000 KW at power factors of

            (i) 0.8 leading        (ii) 0.8 lagging.                             7M

18) a)  Explain the procedure of synchronization of alternators by using synchroscope method?

    b)  Two similar 400 V, 3-phase alterantors share equal kW power delivered to a balanced 3-phase, 40kW, 0.8 p.f. lag load. If the power factor of one machine is 0.85 lag, find the power factor and the current supplied by the other machine.

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