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BIEE-004

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

00562

December, 2017

BIEE-004 : ELECTRICAL MACHINES – I

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks. Use of scientific calculator is allowed.*

1. (a) Explain the Ideal Transformer. Draw a phasor diagram for an ideal transformer on no-load. 7

(b) Derive an equivalent circuit for a single-phase transformer on load. 7

2. (a) Explain self and separately excited dc machines. 7

(b) Explain different methods used for improvement of commutation. 7

3. (a) Explain Armature Reaction in dc machines. How can it be minimised ? 7

(b) Derive an expression for maximum efficiency of a single phase transformer. 7

4. (a) Explain the main parts of a four-pole dc generator with the help of a diagram. 7

(b) What are the different methods of speed control of a dc motor ? Explain any one of them. 7

5. (a) Distinguish between lap and wave winding. 7

(b) A lap wound dc generator having 80 slots with 10 conductors per slot generates at no load an emf of 400 V when running at 1000 rpm. At what speed should it be rotated to generate a voltage of 220 V on open circuit ? 7

6. (a) Explain the construction and working of a 3-ϕ transformer. 7

(b) Explain the parallel operation for a 3-ϕ transformer. 7

7. (a) Derive an expression for zero voltage regulation and maximum voltage regulation. 7

(b) A single phase, 250/500 V transformer gave the following results :

Open Circuit Test : 250 V, 1 A, 80 W on lv side

Short Circuit Test : 20 V, 12 A, 100 W on hv side

Calculate the circuit constants and show them on an equivalent circuit. 7

8. Write short notes on any ***two*** of the following : *2×7=14*

(a) All Day Efficiency

(b) Merits and Demerits of Autotransformers

(c) Applications of DC Series, DC Shunt and DC Compound Motors