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BIEE-004

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

Term-End Examination

December, 2015

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

(a) Four-point starter

(b) Compound d.c. generator

(c) Auto-transformer

2. Discuss the cross-magnetising and demagnetising effects of armature reaction in d.c. machine. Also, explain the methods of decreasing the effects of armature reaction in detail. *14*

3. (a) Why is d.c. series motor not started at no load ? Justify your answer with suitable characteristic. *7*

(b) A 250 V compound generator has armature, series-field and shunt-field resistances 0·4 Ω, 0·2 Ω and 125 Ω, respectively. If this generator supplies 10 kW at rated voltage, determine the emf generated in the armature when the machine is connected as long shunt. 7

4. (a) Discuss the speed control of d.c. motor using Ward-Leonard method. 7

(b) Explain the significance of back emf in a d.c. motor. 7

5. (a) Explain the open circuit test of a single-phase transformer with the help of a connection diagram. 7

(b) A 200 kVA 11000/400 V, Δ-Y transformer, gave the following no-load test :

Test Voltage = 400 V

Test Current = 9 A

Power Consumed = 1·5 kW.

Determine the equivalent circuit parameter referred to high voltage side. 7

6. (a) Establish the condition for determining maximum efficiency of a transformer. 7

(b) A 10 kVA, 2500/250 V, 1-ϕ transformer gave the following test results :

Open-circuit test : 250 V, 0·8 A, 50 W

Short-circuit test : 60 V, 3 A, 45 W.

Calculate the efficiency at half full load at 0·8 p.f. 7

7. (a) Explain the working of a tap changer transformer using schematic diagram. 7

(b) Explain power and distribution transformers in detail. 7