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BIEE-004

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

00255

Term-End Examination

December, 2014

BIEE-004 : ELECTRICAL MACHINES-I

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***five*** *questions. Use of scientific calculator is allowed.*

1. (a) Name the main parts of a d.c. machine. State the function of each part and the materials used for each part. 7

(b) What is armature reaction ? Write the different methods of neutralising the effect of armature reaction. 7

2. (a) Draw the circuit diagram of the different types of d.c. generators. Also draw external characteristics for d.c. shunt and d.c. series generator. 7

(b) A shunt generator delivers 450 A at 230 V and the resistance of the shunt field and armature winding are 50 Ω and 0·03 Ω respectively. Calculate the generated e.m.f. 7

3. (a) What do you understand by the term 'back e.m.f.' ? A d.c. shunt motor connected to a 460 V supply has an armature resistance of 0·15 Ω. Calculate 7

(i) the value of back e.m.f. when armature current is 120 A.

(ii) the value of armature current when the back e.m.f is 447·4 V.

(b) Derive an expression for the torque produced in a d.c. motor. Give any two applications of d.c. series motor. 7

4. (a) Discuss different methods of speed control of a d.c. motor. 7

(b) What is a starter ? What is its necessity for starting a d.c. motor ? 7

5. (a) A single phase transformer has 400 primary and 1000 secondary turns. The net cross-sectional area of the core is 60 cm^2. If the primary winding be connected to a 50 Hz supply at 520 V, calculate 7

(i) the peak value of flux density in the core.

(ii) the voltage induced in the secondary winding.

(b) Draw and explain the phasor diagram of a practical single phase transformer supplying to lagging load. 7

6. (a) What is an autotransformer ? How does it differ from a conventional two winding transformer ? 7

(b) What do you mean by efficiency of a transformer ? Derive the condition for maximum efficiency. 7

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

(a) Power transformer and distribution transformer

(b) Three phase transformer connections

(c) Parallel operation of three phase transformers