QPC: RD19BTECH067 AR 19 Reg. No

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Third Semester – Regular) Examinations, December – 2020

BPCEE3020 / BPCEL 3020 – Electrical Machines - I

(EE & EEE)

Time: 2 hrs Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 =10 Marks)**

Q.1. Answer ***ALL*** questions

a. The armature of D.C generator is laminated to
   (i) reduce the bulk (ii) provide passage for cooling air
   (iii) insulate the core (iv) reduce eddy current loss

b. In lap winding, the number of brushes is always
   (i) double the number of poles (ii) same as the number of poles
   (iii) half the number of poles (iv) two

c. The e.m.f generated in a D.C generator is directly proportional to
   (i) flux/pole (ii) speed of armature
   (iii) number of poles (iv) all of the above

d. The direction of rotation of D.C series motor can be changed by
   (i) interchanging supply terminals (ii) interchanging field terminals
   (iii) either (i) and (ii) (iv) none of the above

e. In D.C machines the residual magnetism is of the order of
   (i) 2 to 3 % (ii) 10 to 15%
   (iii) 20 to 25 % (iv) 50 to 75%

f. Which D.C motor is preferred for elevators?
   (i) Shunt motor (ii) Series motor
   (iii) Differentially compound motor (iv) Cumulatively compound motor

g. Which of the following does not change in transformer
   (i) Current (ii) Voltage
   (iii) Frequency (iv) All of the above

h. Sumpner's test is conducted on transformer to determine
   (i) temperature (ii) stray losses
   (iii) all-day efficiency (iv) none of the above

i. The transformer ratings are usually expressed in terms of
   (i) volts (ii) amperes
   (iii) kW (iv) kVA

j. Open circuit test on transformers is conducted to determine
   (i) hysteresis losses (ii) copper losses
   (iii) core losses (iv) eddy current losses

PART – B: (Short Answer Questions) (2 x 5 = 10 Marks)

Q.2. Answer ***ALL*** questions

a. Explain the principle on which generator works.

b. What is the function of compensating winding in D.C. Machine?

c. Define Transformer?

d. What is the condition for maximum efficiency in a transformer?

e. What is a 3-phase transformer?

PART – C: (Long Answer Questions) (6 x 5 = 30 Marks)

Answer ***ANY FIVE*** questions Marks

3. Explain in detail with necessary sketches about construction of a D.C. machine. (6)

4. Explain in detail about armature reaction in D.C. generator. (6)

5. The following is the magnetic (c/s) of a D.C. generator driven at 1000 r.p.m. (6)

I_f (A) :	1	2	4	6	8	10
E_o(V):	160	260	390	472	522	550

Determine:

(i) The voltage to which it will excite on open circuit.

(ii) (ii) The approximate value of the critical resistance of shunt circuit. (iii) The terminal potential difference and load current for a load resistance of 4Ω the armature and field resistance are 0.4 Ω and 60 Ω respectively.

6. A 10 KW shunt generator having an armature circuit resistance of 0.75 Ω and a field resistance of 125 Ω, generates a terminal voltage of 250 V at full load. Determinate the efficiency of the generator at full load, assuming the iron, friction and windage losses amount to 600 W. (6)

7. Explain in detail about constructional details of transformer. (6)

8. Derive an e.m.f. equation of transformer. (6)

9. Explain in detail about the constructional features of three phase transformers. (6)

10. What are the types of three-phase transformer connections? Explain any 2 types with a neat sketch? (6)

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