4th Semester Regular / Back Examination 2018-19
ELECTRICAL MACHINES - II
BRANCH : EEE
Max Marks : 100
Time : 3 Hours
Q.CODE : F837

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1   **Only Short Answer Type Questions (Answer All-Ten)**   **(2 x 10)**

a) Why the armature winding in a DC machine is always double layer winding?

b) What is the effect of armature reaction in D.C generator?

c) What happens if DC machine is operated at a speed below the rated speed?

d) What is the coil span to eliminate 7th Harmonic in term of pole pitch?

e) Why Load angle is positive in case of alternator and negative in case of motor?

f) The resultant flux density in the air gap of synchronous generator is lowest during:
   a. Open circuit b. Short circuit c. Full load d. Half Load

g) Which alternator uses damper winding, state the reason?

h) What is Short circuit ratio of Alternator and what is effect on size of alternator?

i) What is turbo Alternator?

j) Why the flux wave is not sinusoidal in Salient pole machine?

Part- II

Q2   **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**   **(6 x 8)**

a) Explain commutation in DC generator.

b) Explain the internal and external characteristic for self and separately excited DC generator.

c) Why starter is necessary for DC motor. Explain any starting method.

d) A 250V shunt motor on no-load runs at 1000 r.p.m. and takes 5A.The total armature and shunt field resistances are 0.2 Ω and 250 Ω respectively. Calculate the speed when loaded and taking current of 50A if armature reaction wakens the field by 3%.

e) Explain universal motor. Draw speed-Load characteristics for both AC and DC and state its applications.

f) Explain the construction of alternator and write the advantages of stationary armature.

g) A 10 kVA, 440V, 1200 rpm 3 phase, Y connected alternator hasarmature winding resistance is (0.3+j5) Ω/phase. When generator operates at its full load and 0.8 pf lagging. Determine
   a. voltage regulation
   b. Generated emf.

h) Explain the effect of increased load on synchronous motor under condition of normal, under and over-excitation.

i) A 12 pole 3 phase star connected alternator has 72 slots. The flux per pole 0.88 Wb. Calculate :
   a. The speed if frequency of generated EMF is 50Hz.
   b. The terminal emf for full pitch coils and 8 conductors per slot.
   c. The terminal emf if coil span is reduced to 2/3 of pole pitch.

j) What is voltage regulation of alternator? Explain synchronous impedance voltage regulation method.

k) Explain V and inverted V curve.

l) How to get continuous unidirectional torque in synchronous motor? Explain the procedure to make it self-starting.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Discusthe armature winding of D.C machine. With neat sketch show $Y_F, Y_B, Y_R, Y_C, Y_S, Y_A, N_C, C_S$ **(16)** and write the relations between them for both lap and wave winding.

Q4 Describe the speed control of D.C shunt and series motor and discus the advantages and **(16)** disadvantages of that methods.

Q5 Derive the EMF equation of an alternator. Describe the parallel operation and state the **(16)** advantages of Parallel operation.

Q6 Describe the Operating principle and one starting method of three phase synchronous motor. **(16)** Draw the Phasor diagram for normal, under and over excited condition.