GANPAT UNIVERSITY

B. TECH SEM- III (ELECTRONICS & COMMUNICATION)
REGULAR EXAMINATION NOV - DEC 2016
2EE308: ELECTRICAL ENGINEERING

TIME: 3 HRS   TOTAL MARKS: 60

Instructions:
1. This Question paper has two sections. Attempt each section in separate answer book.
2. Figures on right indicate marks.
3. Be precise and to the point in answering the descriptive questions.
4. Make suitable assumptions wherever necessary.

SECTION : I

Q.1 (A) Deduce an emf equation for transformer. Define transformation ratio. (04)

(B) Explain the effect of load on transformer with necessary phasor diagram. (04)

(C) A single phase transformer has 400 primary and 1000 secondary turns. The net cross sectional area of the core is 60 cm². If the primary winding be connected to a 50 Hz supply at 520 V, calculate the i) flux density ii) voltage at secondary side. (02)

OR

Q.1 (A) List the conditions for parallel operation of transformers. (03)

(B) Which parameters can be derived form no load test of transformer? How? (04)

(C) In a 25 KVA, 2000/200 V, single phase transformer, the iron and full load copper losses are 350 W and 400 W respectively. Calculate the efficiency at unity power factor on i) full load and ii) half full load. (03)

Q.2 (A) What are the advantages of stationary armature? Derive an emf equation of alternator. (04)

(B) Define term voltage regulation. Draw vector diagrams for unity, lagging and leading condition for alternator. (04)

(C) Calculate the pitch factor for the 36 stator slots, 4 poles, coil span 1 to 8. (02)

OR

Q.2 (A) Explain power stages of synchronous motor. Also draw equivalent circuit of a synchronous motor. (04)

(B) List the procedure of starting of synchronous motor. (03)

(C) Make a comparison between synchronous motor and induction motor. (03)

Q.3

(A) Make a short note on Auto transformer. (04)

(B) List the different methods used to define voltage regulation in alternator. Explain any one in detail. (04)

(C) Write different applications of AC machines. (02)

SECTION : II

Q.4 (A) Explain the working principle of DC generator. Only list the different types of DC generator. (05)

(B) Derive an equation of torque under running condition for induction motor. Also define maximum torque equation under running condition. (05)

OR

Q.4 (A) How star delta starter works for starting of induction motor? (04)

(B) Explain the torque vs armature current and speed vs armature current characteristics for DC series motor. (03)

(C) What do you mean by back emf in DC motor? Give the significance of back emf (03)

Q.5 (A) A shunt generator delivers 195 A at terminal voltage of 250 V. The armature resistance and shunt field resistance are 0.02 ohm and 50 ohm respectively. The iron and friction losses are 950 W. Find **i)** generated emf **ii)** Total Copper losses and efficiency. (04)

(B) Draw and explain torque vs slip characteristics curve for induction motor. Explain the maximum torque and starting torque. (04)

(C) Give the power stages of 3 phase induction motor. (02)

OR

Q.5 (A) Calculate the value of torque produced by 3 phase induction motor having 6 pole, 50 Hz supply and operating with 3 % slip, which develops a maximum torque of 160 N-m at a speed of 850 rpm. The resistance per phase is 0.55 ohm. (04)

(B) Define the term armature reaction. What are the effects of armature reaction on DC generator? (04)

(C) Why single phase induction motor is not self-start? (02)

Q.6 Attempt any two. (10)

(A) What is the need of starter in DC motor? Discuss three point starter in detail.

(B) 1. A 12 pole 3 phase alternator driven at a speed of 500 rpm supplies power to an 8 pole, 3 phase induction motor. If the slip of the motor at full load is 3%, calculate the full load speed of the motor.

2. A DC motor takes an armature current of 110 A at 480 V. The armature circuit resistance is 0.2 ohm. The machine has 6 pole and armature is lap connected with 864 conductors. The flux per pole is 0.05 Wb. Calculate **i)** speed **ii)** gross torque developed by armature.

(C) Enlist the ways to make single phase induction motor self-start. Write a short note on split phase induction motor.

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