Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019
Course Code: EE216
Course Name: ELECTRICAL ENGINEERING

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions. Each question carries 15 marks

1 a) Derive the EMF equation of a single phase transformer   (5)

   b) A 220/110 V single phase transformer takes a no-load current of 3 A at 0.2 p.f.   (5)
       lagging. When a load is connected the secondary supplies a current of 80 A at a p.f.
       0.8 lagging, find the current taken by the primary. Neglect winding resistance and
       leakage flux.

   c) Explain the working principle of a step up and step down auto transformer   (5)

2 a) Explain the phenomenon of armature reaction and its effects in a DC generator   (8)
       with the help of neat diagrams.

   b) Draw the power flow diagram of a DC generator and explain the various losses   (7)
       occurring in the machine.

3 a) Explain the need and condition for parallel operation of DC Generators.   (5)

   b) What is the function of interpoles in a DC generator? Explain it with the help of a   (5)
       neat diagram.

   c) A 3 phase, 50 Hz transformer has a voltage ratio (line voltages) of 11,000/220 V   (5)
       and is delta/star connected. The secondary has a star connected balanced load at
       0.6 pf lagging. The line current on the primary side is 6 A. Determine the current in
       each coil of the primary and secondary. What is the output of transformer in kW ?

PART B
Answer any two full questions. Each question carries 15 marks

4 a) Explain swinburns test in DC shunt motor to predetermine the efficiency at any   (6)
       load

   b) Explain the significance of back emf in a DC Motor.   (5)

   c) A 440 V DC shunt motor runs at 1200 r.p.m. when the armature current is 55 A.   (4)
       Calculate the speed if the torque is doubled. The armature resistance of the motor
       is 0.2 Ω.

5 a)   Explain any two starting methods of synchronous motor.   (6)

   b)   Derive the emf equation of an alternator.   (5)

   c)   Calculate the value of the distribution factor for a single layer three phase winding of a 8 pole alternator having 48 slots.   (4)

6 a)   Explain the working of a three phase induction motor.   (8)

   b)   Explain the thyrisor control of DC shunt motor.   (7)

PART C
Answer any two full questions. Each question carries 20 marks

7 a)   With neat diagrams, explain the working of a split-phase single phase induction motor and capacitor start single phase induction motor.   (10)

   b)   Draw the torque - slip characteristics of a three phase induction motor and explain the variation of maximum torque and starting torque with respect to rotor resistance.   (5)

   c)   Discuss about various torques required in an indicating instrument.   (5)

8 a)   Explain the construction and working of a permanent magnet moving coil instrument.   (10)

   b)   Discuss about the features and working of a DC servomotor.   (6)

   c)   Explain how a 1 mA DC ammeter with an internal resistance of 100 Ω can be converted into a (0-100) mA ammeter.   (4)

9 a)   With neat diagrams and necessary equations explain how three phase power is measured using two wattmeter method? Also write the effect of power factor on the readings of wattmeters.   (10)

   b)   With a neat diagram, explain the working of a three phase induction generator.   (6)

   c)   What are the advantages and disadvantages of Moving Iron instruments?   (4)