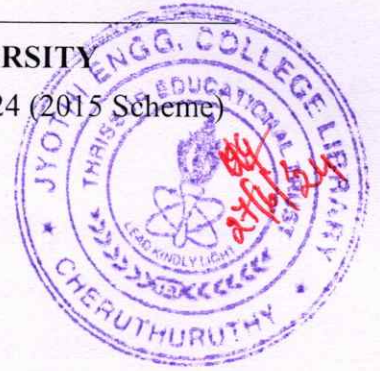Reg No.:_____   06000EE311122005me:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S, FE) / S5 (PT) (S,FE) Examination June 2024 (2015 Scheme)

Course Code: EE311
Course Name: ELECTRICAL DRIVES & CONTROL FOR AUTOMATION

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any three full questions, each carries 10 marks.   Marks

1   a)   What are the applications of dc generator?   (2)

    b)   Give the classification of dc generators based on their field winding excitation   (4)
         with diagrams

    c)   Derive an expression for the e.m.f. generated in a dc generator.   (4)

2   a)   Draw the different characteristics of a dc shunt generator and name them.   (3)

    b)   What are the effects of armature reaction in dc generator?   (3)

    c)   A 6 pole dc shunt generator with 780 wave connected armature conductors and   (4)
         running at 500rpm supplies a load of 12.5 ohms resistance at a terminal voltage
         of 250 V..The armature resistance is 0.25 ohms and field resistance is 250
         ohms. Find the following i) Armature current ii) induced EMF iii) Flux per
         pole.

3   a)   With the help of a neat sketch explain the load test of a dc shunt motor.   (3)

    b)   With the help of block diagram explain the power stages of dc motor   (2)

    c)   A 220 V dc shunt motor carries an armature current of 40 A and runs at a speed   (5)
         of 500 rpm. The armature resistance is 0.25 Ω. If the flux is reduced by 5% and
         the torque remains the same, find the new speed of the motor.

4   a)   With the help of a neat diagram, explain the electrical and mechanical   (5)
         characteristics of dc shunt motor.

    b)   Explain the different losses in a d.c. machine and derive the condition for   (5)
         maximum efficiency.

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PART B
Answer any three full questions, each carries 10 marks.

5   a)   Derive the EMF equation of a transformer   (4)

   b)   Explain the vector diagram of transformer under no load   (6)

6   a)   Write short notes on current transformer and potential transformer.   (5)

   b)   The maximum flux density in the core of a 240/3000V,50 Hz single phase   (5)
transformer is 1.3Wb/m2 . If the EMF per turn is 8Volt. Determine i) primary
and secondary turns ii)area of the core

7   a)   Explain the torque slip characteristics of a three-phase induction motor with   (4)
neat diagram.

   b)   Explain how rotating magnetic field is produced in a three-phase induction   (6)
motor with the help of a neat diagram.

8   a)   Explain the working principle of three phase induction motor with neat   (6)
diagrams

   b)   Explain with the help of neat diagram the working of any two methods of   (4)
starting a 3-phase induction motor

PART C
Answer any four full questions, each carries 10 marks.

9   a)   What are the methods of starting a single-phase induction motor?   (6)

   b)   Draw and explain V curves of a synchronous motor.   (4)

10 a)   How voltage regulation of an alternator is determined by EMF method. Explain   (6)

   b)   Explain the working of a universal motor with the help of its diagram.   (4)

11 a)   Considering pitch and distribution factors, derive emf equation of an alternator.   (6)

   b)   Explain the principle of synchronous condenser and give its applications.   (4)

12 a)   Explain the working of variable reluctance stepper motor with neat diagram.   (6)

   b)   Draw and explain the torque speed characteristics of a stepper motor.   (4)

13 a)   Explain the working of Hybrid stepper motor with the help of a neat diagram.   (5)

   b)   Explain programmable logic controllers with neat diagram   (5)

14 a)   Explain the working of a digital controller.   (4)

   b)   Write short notes on axis controller and machine tool controller.   (6)

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