B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Fourth Semester

Electronics and Instrumentation Engineering

(Common to Instrumentation and Control Engineering)

20EIPC401 - ELECTRICAL MACHINES

(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	Point out the reason why the air gap between the pole pieces and armature is kept very small.	2,K2,CO1
2.	Series motors should never be started without any load. Comment the statement.	2,K2,CO1
3.	Full load copper loss in a transformer is 1600 Watts, what will be the loss at half load.	2,K2,CO2
4.	Does the transformer draw any current, when the secondary is open? Justify with your answer.	2,K2,CO2
5.	State the causes of voltage drop in an alternator, when loaded.	2,K2,CO3
6.	What is meant by hunting?	2,K1,CO3
7.	The starting torque of a squirrel cage induction motor cannot be altered, when the supply voltage is constant. Comment the statement.	2,K2,CO4
8.	Define slip.	2,K1,CO4
9.	Single phase induction motors are not self starting. Why?	2,K2,CO5
10.	Give some applications of stepper motors.	2,K1,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11.	a)	With a neat sketch, explain the construction and working principle of DC generators. Mention the functions of each parts and the type of material used.	13,K2,CO1

OR

	b)	Delineate the working principle of three point starters with neat sketch. Also mention its advantages and disadvantages.	13,K2,CO1

12.	a)	Draw the equivalent circuit of 1100V/220V transformer on which the following results were obtained as follows:	13,K3,CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12089**

(i) 1100V, 0.5A, 55W on primary side, secondary being open circuited and

(ii) 10V, 80A, 400W on LV side, when higher voltage side being Short circuited.

Calculate the voltage regulation and efficiency for the above transformer, when supplying a load of 100A, 0.8 p.f lagging.

OR

b) (i) With phasor diagrams, explain the working of transformers on no load and loaded condition.   *6,K2,CO2*

(ii) Starting from the initial assumptions, derive the expression for emf equation of transformer.   *7,K2,CO2*

13. a) (i) With neat sketch, describe the construction and working principle of salient pole alternator.   *7,K2,CO3*

(ii) Derive the emf equation of an alternator.   *6,K2,CO3*

OR

b) Elucidate the various starting methods of synchronous motors with relevant diagrams.   *13,K2,CO3*

14. a) Explain the various speed control methods of three phase induction Motors? Mention their advantages and disadvantages.   *13,K2,CO4*

OR

b) Describe in detail the construction and working of three phase induction motors with neat sketch.   *13,K2,CO4*

15. a) Delineate in detail about double field revolving theory with respect to the starting of single phase induction motors.   *13,K2,CO5*

OR

b) With neat diagrams, explain the working principle of   *13,K2,CO5*
    (i) Switched reluctance motors.
    (ii) Stepper motors.

PART - C (1 × 15 = 15 Marks)

16. a) With assumptions, derive the expression for torque developed in three phase induction motors? Also explain their torque-slip characteristics.   *15,K3,CO3*

OR

b) Explain in detail about three phase transformers with neat sketch? Also mention the types of connections available for changing the voltage from one level to another level.   *15,K2,CO2*