KUMARAGURU
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GENERAL INSTRUCTIONS TO THE CANDIDATES

1. Candidates are instructed to answer the questions as per Bloom's Taxonomy knowledge level (K_1 to K_6)

2. Candidates are strictly instructed not to write anything in the question paper other than their roll number.

3. Candidates should search their pockets, desks and benches and handover to the Hall Superintendent/ Invigilator if any paper, book or note which they may find therein as soon as they enter the examination hall.

4. Candidates are not permitted to bring electronic watches with memory, laptop computers, personal systems, walkie-talkie sets, paging devices, mobile phones, cameras, recording systems or any other gadget / device /object that would be of unfair assistance to him / her.

5. Corrective measures as per KCT examination policies will be imposed for malpractice in the hall like copying from any papers, books or notes and attempting to elicit the answer from neighbours.

B.E DEGREE EXAMINATIONS: DEC 2015

(Regulation 2014)

Third Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U14EET312**:** Electrical Machines

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A): In dc shunt generator, the voltage build up may not be possible if the field resistance is high.   CO1   [K$_4$]

   Reason (R): The shunt generator will build up only when the field circuit resistance is

   less than the critical field resistance

   a)   Both A and R are correct   b)   Both A and R are wrong

   c)   A is correct and R is wrong   d)   A is wrong and R is correct

2.   1. DC series generators are used as boosters on DC feeders.   CO1   [K$_2$]

        2. For DC shunt motor armature torque is directly proportional to the armature

            current.

        3. Over load release is not available in three point starter.

4. Hopkinson's test is used for pre determining the efficiency.

Which of the above statements are correct?

a) 1,3
b) 1,2
c) 3,4
d) 2,3

3.   1. Total losses and input to the transformer are calculated   CO3   [K₂]

   2. From open circuit test iron losses are calculated

   3. Efficiency is calculated as the ratio of output to input

   4. From short circuit test copper losses are calculated

Find the correct sequence for calculating the efficiency of a transformer.

a) 2,4,3,1
b) 1,2,3,4
c) 4,3,2,1
d) 2,4,1,3

4.   Transformer is laminated to reduce   CO3   [K₁]

a) Eddy current loss
b) Hysteresis loss
c) Both (a) and (b)
d) Increases exciting current

5.   The starting torque of a three phase induction motor can be increased by increasing   CO4   [K₁]

a) The rotor resistance
b) The rotor reactance
c) The stator resistance
d) The stator reactance

6.   In star-delta starting of a squirrel cage induction motor compared with DOL needs to be   CO4   [K₁]
expanded, starting current and torque are reduced by factors of

a) $1/\sqrt{3}$, 1/3
b) 1/3, 1/3
c) $1/\sqrt{3}$, $1/\sqrt{3}$
d) 1/3, $1/\sqrt{3}$

7.   In an alternator, the frequency per revolution is equal to   CO5   [K₂]

a) Number of poles
b) Number of pairs of poles
c) Number of armature turns
d) Number of armature conductors

8.   In a synchronous motor the inverted V curve represents the relation between,   CO5   [K₁]

a) Field current and power factor
b) Field current and armature current
c) Armature current and power factor
d) Field current and torque

9.   AC series motors are built with a few field turns as possible to reduce   CO6   [K₁]

a) Flux
b) Eddy current loss
c) Reactance
d) Speed

10. CO6 [K2]

List I	List II
A. stepper motor	i. runs in both ac and dc supply
B. universal motor	ii. multi speed operation using gear train
C. reluctance motor	iii. precise increment in shaft position
D. Hysteresis	iv. poor power factor

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	iii	i
c)	iv	ii	i	iii
d)	iii	i	iv	ii

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. Define critical resistance. CO1 [K1]

12. What is the use of no volt coil? CO1 [K1]

13. What are the types of transformers based on construction? CO3 [K1]

14. What are the uses of instrument transformers? CO3 [K2]

15. Define slip. CO4 [K1]

16. What are the methods of speed control of induction motors from stator side? CO2 [K1]

17. Which type of alternator is suitable for hydroelectric plants and why? CO5 [K2]

18. Mention the advantages of synchronous motors. CO5 [K1]

19. State the applications of brushless dc motor. CO6 [K1]

20. What are the advantages of switched reluctance motor? CO6 [K1]

PART C (5 x 14 = 70 Marks)

(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. (i) Derive the emf equation of a dc generator. (6) CO1 [K$_5$]

    (ii) Draw the OC, internal and external characteristics of DC shunt generator. (8) [K$_4$]

22. Explain how speed control is achieved in DC shunt motors. (14) CO2 [K$_2$]

23. A single phase 10 kVA, 2000/200 V, 50 Hz transformer has the following test (14) CO3 [K$_4$] results:

    OC test (LV side): 200 V, 0.8 A, 60 W

    SC test: (HV side): 40 V, 4 A, 70 W

    Calculate the efficiency of the transformer at half load and 0.8 pf lagging.

24. Derive the torque equation for a three phase induction motor. (14) CO4 [K$_5$]

25. Discuss the various methods of starting synchronous motor. (14) CO5 [K$_2$]

26. Explain the construction and working principle of hysteresis motor (14) CO6 [K$_2$]

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