

C. U. SHAH UNIVERSITY
Winter Examination-2019

Subject Name: Electrical Machines & Electronics

Subject Code: 4TE03EMN1

Branch: B.Tech (Mechanical)

Semester: 3

Date :15/11/2019

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1 Attempt the following questions: (14)

- 1) A Step up transformer increases
A) Voltage B) Current C) Power D) Frequency
- 2) Skin effect does not exist in DC system.
A) True B) False.
- 3) The critical resistance of the d.c.generator is resistance of
A) Armature B) Field C) Load D) brushes
- 4) D.C. shunt motors are used for driving
A) trains B) cranes C) hoists D) machine tools
- 5) In a dc machine 4 pole lap winding is used. The numbers of parallel paths are
A) 4 B) 1 C) 2 D) 3
- 6) In a 3-phase induction motor, the rotor field rotates at synchronous speed with respect to
A) stator B) rotor C) stator flux D) none of the above
- 7) Slip rings are usually made of
A) copper B) carbon C) phosphor bronze D) aluminum
- 8) The frequency of voltage generated by an alternator having 4-poles and rotating at 1800 p.m. isHertz
A) 60 B) 720 C) 120 D) 450.



- 9) Draw pin diagram of 741 IC.
- 10) What is function of inverting and non-inverting amplifier?
- 11) How may the direction of rotation of a d.c. motor be reversed?
- 12) Draw symbol of NAND and NOT gates.
- 13) Write different types of tariffs.
- 14) Explain the function of commutator.

Attempt any four questions from Q-2 to Q-8

- Q-2 Attempt all questions (14)**
- (a) Derive the E.M.F equation for Simplex lap and wave wound generator. (07)
 - (b) Explain any two speed control methods of d.c. shunt motor. (07)
- Q-3 Attempt all questions (14)**
- (a) Give the types of tariff. Explain any three in details. (07)
 - (b) Discuss different types of d.c. generators with neat diagram. (07)
- Q-4 Attempt all questions (14)**
- (a) Draw the circuit diagram and waveforms of full wave bridge rectifier and explain its operation. (07)
 - (b) A short-shunt compound generator delivers a load current of 30A at 220V, and has armature, series-field and shunt-field resistances of 0.05 Ω , 0.30 Ω and 200 Ω respectively. Calculate the induced emf. and the armature current. Allow 1.0 V per brush for contact drop. (07)
- Q-5 Attempt all questions (14)**
- (a) Derive the EMF equation for single phase transformer. (07)
 - (b) State the advantages of DC transmission over AC transmission. (07)
- Q-6 Attempt all questions (14)**
- (a) Classify different types of substations. Explain pole mounted substation with neat diagram. (07)
 - (b) Write short note on De-Morgan's theorem with truth table. (07)
- Q-7 Attempt all questions (14)**
- (a) Define the term "slip" of induction motor. Draw and Explain the torque-slip characteristics of a three phase induction motor. (07)
 - (b) Explain AND, OR and NAND gate with truth tables. (07)



- Q-8** **Attempt all questions** **(14)**
- (a) What is difference between autotransformer and two winding transformer? Write short note on autotransformer. **(07)**
- (b) What is voltage regulation of an alternator? Explain synchronous impedance method. **(07)**

