

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name : Electrical Machines & Electronics

Subject Code : 4TE03EMN1

Branch: B.Tech (Automobile,Mechanical)

Semester : 3

Date : 23/03/2017

Time : 10:30 To 01:30

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)

- a) The sparking at the brushes occurs if (a) Brushes are not set considering the Magnetic Neutral Axis (b) Brushes are not having proper spring tension (c) heavy armature reaction is present
 - (i) Only statement (a) is true
 - (ii) Statement (b) and (c) is true while (a) is false
 - (iii) All the statements are true
 - (iv) Can't say
- b) A D.C. machine in the plant is running as generator it can be used as
 - (i) Generator only
 - (ii) Motor only
 - (iii) Generator or motor depending upon the type of input mechanical or electrical as per requirement
 - (iv) Can't say
- c) A field winding of a D.C. shunt motor is disconnected when it was given the armature voltage
 - (i) it will not start
 - (ii) it will start with a very low speed
 - (iii) It will start with a very high speed
 - (iv) It will continue its normal operation
- d) A transformer is shell type if
 - (i) All the windings of a transformer are surrounding the core
 - (ii) If all the windings of a transformer are surrounded by the core
 - (iii) Either of (i) or (ii) is true
 - (iv) Neither of (i) or (ii) is true.
- e) An e.m.f. in a transformer is developed
 - (i) by electrostatic induction
 - (ii) by electromagnetic induction
 - (iii) by dynamically induction
 - (iv) by photovoltaic induction
- f) The slip in a induction motor is



- (i) The difference between the stator and rotor rotating magnetic field
- (ii) The difference of potential between stator voltage and rotor voltage
- (iii) The difference of frequency between stator and rotor emf
- (iv) None of the above
- g)** The running torque of an induction motor is affected by
 - (i) slip of the motor (ii) speed of the motor (iii) slip/speed of the motor (iv) independent of the speed of the motor
- h)** The circuit breaker in a substation is useful for
 - (i) making or braking the circuit in a normal operation
 - (ii) making or braking the circuit in abnormal condition
 - (iii) making or braking the circuit in abnormal as well as normal condition
 - (iv) sensing the fault of the electrical circuit.
- i)** The D.O. fuse is used for
 - (i) home application
 - (ii) Generator application
 - (iii) Pole mounted transformer
 - (iv) PCB application
- j)** The load factor of a substation is 0.75 . The maximum demand is 100 MW. The average demand will be _____.
- k)** The value of gain beta for the transistor is 50 . The value of gain factor alpha for transistor will be ____ .
- l)** The slew rate parameter refers to _____ device.
- m)** The NAND and NOR gate are identified as a _____ gate.
- n)** The amplifier operation of transistor refers to
 - (i) Cut off region of its characteristic
 - (ii) Active region of its characteristic
 - (iii) Saturation region of its characteristics
 - (iv) Complete region of its characteristics

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

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| Q-2 | Attempt all questions | (14) |
| (a) | State and explain internal and external characteristics of a D.C. Generator. | (7) |
| (b) | Draw the various parts of D.C. Generator . | (7) |
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| Q-3 | Attempt all questions | (14) |
| (a) | State the application of various types of D.C. motors and D.C. generators. | (7) |
| (b) | Derive the torque equation and back emf equation for D.C. Shunt motor. | (7) |
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| Q-4 | Attempt all questions | (14) |
| (a) | Derive the e.m.f. equation for a single phase transformer. | (7) |
| (b) | Explain the significance of no load current for a single phase transformer. | (7) |
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| Q-5 | Attempt all questions | (14) |
| (a) | Derive the equation of starting torque for a 3 phase induction motor. | (7) |
| (b) | Discuss the Torque Slip Characteristics of 3 phase induction motor. | |
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| Q-6 | Attempt all questions | (14) |
| (a) | Discuss the output characteristics of common emitter configuration of transistor. | |
| (b) | Briefly explain the cascaded connection of transistor amplifier. | |



- Q-7** **Attempt all questions** **(14)**
- (a) List the various electrical parts of substation. Briefly describe the function of each part. **(7)**
- (b) Briefly describe the term Load factor, Load duration curve, Load curve, Connected load and Maximum demand with necessary details. **(7)**
- Q-8** **Attempt all questions** **(14)**
- (a) Explain the D’Morgan’s Law for Boolean Algebra.
- (b) Prove that NAND gate is a universal gate.

