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16172

3 Hours / 100 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each Section on separate answer sheet.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

SECTION - I

- 1. Attempt any NINE of the following: **18****
- a) A furnace takes a current of 10 Amp from a 220 volt dc supply for 8 hours. Calculate the electrical energy consumed in kWh.
 - b) A potential difference of 2.5 volt causes a current of 250 micro Amp to flow in a conductor. Calculate the resistance of the conductor.
 - c) List the classification of d.c. motor.
 - d) Define the following term related to A.C.:
 - (i) Periodic time
 - (ii) Instantaneous value
 - e) State the function of commutator in d.c. motor.

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- f) Write working principle of d.c. motor.
- g) State any two applications of 3-phase squirrel cage induction motor.
- h) “An induction motor cannot run at synchronous speed”. Give reason.
- i) A single phase transformer of 50 Hz has maximum flux in core as 0.021 Wb, the number of turns of primary being 460 and that on secondary is 52. Calculate emf induced in primary and secondary windings of a transformer.
- j) State two advantages of autotransformer.
- k) A transformer does not operate on d.c. supply. State reason.
- l) Write the function of fuse and MCCB.

2. Attempt any FOUR of the following:

16

- a) Write comparison between single phase and three phase AC supply (any four points).
- b) State the necessity of starter for dc motor. Also give two applications of dc series motor and dc shunt motor.
- c) Explain briefly the construction of a three phase I.M.
- d) A 50 kVA single phase transformer has a turns ratio of 300/20. The primary winding is connected to a 2200 V, 50 Hz supply. Calculate:
 - (i) the secondary voltage on no load
 - (ii) secondary current on full load
- e) Explain working principle of fluorescent lamp with diagram.
- f) State any four safety precautions to be taken while handling an electrical equipments.

3. Attempt any FOUR of the following:**16**

- a) State and explain Ohm's law.
- b) Draw the speed-torque characteristics of dc series and d.c. shunt motors. Explain the nature of the graphs.
- c) With neat construction explain working of R-split type of induction motor.
- d) Write four characteristics of ideal transformer.
- e) Draw the wiring diagram for control of one lamp using two switches.
- f) Why earthing is essential in electrical installation? Draw neat sketch of pipe earthing and label it.

SECTION - II**4. Attempt any NINE of the following:****18**

- a) List two applications of transistor.
- b) Draw symbol of zener diode and light emitting diode.
- c) Define semiconductor and insulator.
- d) State any two applications of TRIAC.
- e) Draw the symbol of inductor. List two applications of it.
- f) Draw neat symbol of PNP and NPN transistor.
- g) Define filter. State its function.
- h) Write necessity of power supply.
- i) State principle of zener shunt regulator.
- j) Draw symbol and truth table of:
 - (i) AND gate
 - (ii) NAND gate
- k) State working principle of LCD display.
- l) Which gates are called as universal gates? Why?

- 5. Attempt any FOUR of the following:** **16**
- a) Draw the energy level diagram of a insulator and semiconductor and explain the term forbidden energy gap.
 - b) Explain construction and working of PN junction diode.
 - c) Explain working principle of SCR with the help of neat sketch. Also state its two applications.
 - d) Draw the circuit diagram of single stage common emitter amplifier and explain its working.
 - e) Explain the working of half wave rectifier with the help of circuit diagram.
 - f) Write statement of De-Morgan's theorem. Explain proof of this theorem by using truth table.
- 6. Attempt any FOUR of the following:** **16**
- a) Draw forward and reverse bias condition of PN junction diode. Also draw its V-I characteristics.
 - b) Explain intrinsic and extrinsic semi conductor in details.
 - c) Explain the working of NPN transistor with the help of neat sketch.
 - d) Draw and explain block diagram of power supply.
 - e) Draw and explain circuit diagram of series inductor filter.
 - f) Draw symbol and truth table for following gate:
 - (i) OR gate
 - (ii) NOR gate
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