

17329

21314

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) Answer each next main Question on a new page.
 - (4) Illustrate your answers with neat sketches wherever necessary.
 - (5) Figures to the right indicate full marks.
 - (6) Assume suitable data, if necessary.
 - (7) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (8) 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) Define frequency and phase.
 - b) Define current and voltage with their unit.
 - c) State the relation between line voltage and phase voltage in star and delta connected circuit.
 - d) List any two application of transformer.
 - e) Draw speed torque characteristics of 3-phase IM.
 - f) State classification of drives.

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- g) State necessity of earthing.
- h) State the relation between line current and phase current in star and delta connected circuit.
- i) Define transformation ratio of single phase transformer.
- j) List two application of each motor
 - i) Capacitor start and ran.
 - ii) Universal Motor.
- k) State the function of fuse ? Name the material used for fuse wire.

2. Attempt any FOUR of the following: 16

- a) Suggest various safty precautions which should be taken while working with electricity.
- b) State the meaning of the term MCCB and ELCB and give their applications.
- c) Draw and explain capacitor start and run motor.
- d) Define efficiency and voltage regulation.
- e) State the sequence of three phase supply. Draw the phasor diagram of three phase supply. Write the equation of total power consumed in star connected load.
- f) Define average value and RMS value.

3. Attempt any FOUR of the following: 16

- a) State first aid measures.
- b) State factors for selection of motor for different drives.
- c) Draw and explain Universal motor.
- d) Describe speed control of induction motor by variable frequency drive.
- e) Differentiate between shell type and core type transformer.
- f) Differentiate between auto transformer and two winding transformer.

SECTION – II

4. Attempt any NINE of the following: 18

- a) Draw a symbol of photodiode and LED.
- b) State any four specifications of photo transistor.
- c) Define α and β of the transistor.
- d) A full wave rectifier with capacitor filter employ $R_L = 50\Omega$, $C = 1000\mu F$. Calculate ripple factor.
- e) Define the term gain and bandwidth of an amplifier.
- f) Draw dc load line of CE amplifier and define Q - point.
- g) List the types of oscillator.
- h) State the Barkhausen criteria for oscillator.
- i) Draw logic symbol and expression of AND and EX-OR gates.
- j) Perform the following conversion:
 - i) $(212)_{10} = (?)_2$
 - ii) $(436)_8 = (?)_2$
- k) Draw the symbol, logical expression and truth table of 3 input OR gate.
- l) Define:
 - i) NTC
 - ii) PTC
- m) What is line regulation and load regulation ?

5. Attempt any FOUR of the following: 16

- a) Draw the experimental set-up to obtain V - I characteristics of PN Junction diode in forward bias. Draw V - I characteristics for the same.
- b) Draw the basic block diagram of a regulated power supply. State the function of each block.
- c) Compare Half wave rectifier and Full-wave rectifier. (any four points)
- d) For Hartley oscillator, $C = 10\text{pF}$, $L_1 = 4.7\text{mH}$, $L_2 = 47\mu\text{H}$. Calculate frequency of oscillation.
- e) Draw the circuit diagram of an adder using op-amp. Give its mathematical formula.
- f) Why NAND gate is called universal gate ? Implement AND, OR and NOT gates using NAND gates.

6. Attempt any FOUR of the following: 16

- a) Draw characteristics of UJT. Explain regions on characteristics.
 - b) Draw the circuit diagram of a zener diode as voltage regulator and explain its working.
 - c) Draw the circuit of RC coupled amplifier and state the need for cascading.
 - d) Compare common emitter, common base and common collector transistor configurations.
 - e) Draw RC phase shift oscillator. State the role of phase shift network.
 - f) Convert the following:
 - i) $(1101011)_2 = (?)_{10}$
 - ii) $(11010)_2 = (?)_{10}$
 - iii) $(206)_8 = (?)_{10}$
 - iv) $(3000.45)_8 = (?)_{10}$
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