17329

16117

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions *: (1)* ***All*** *questions are* ***compulsory****.*
(2) Attempt ***all*** *questions including question No.****1*** *which is* ***compulsory****.*
(3) Answer ***each*** *Section on* ***separate*** *answer sheet.*
(4) Answer each next main question on a ***new*** *page.*
(5) Illustrate your answers with neat sketches ***wherever*** *necessary.*
(6) Figures to the ***right*** *indicate* ***full*** *marks.*
(7) Assume suitable data, if ***necessary****.*
(8) Use of Non-programmable Electronic Pocket Calculator is ***permissible****.*

Marks

SECTION – I

1. Attempt **any nine** of the following : **18**

a) Define average and r.m.s. value of alternating quantity.

b) Define power and energy with their unit.

c) State the relation between line current and phase current in star and delta connected circuit.

d) List any two applications of transformer.

e) Draw speed torque characteristics of 3 phase induction motor.

f) State classification of fuses.

g) State necessity of earthing.

h) State expression for active power, reactive power and apparent power for three phase circuit.

i) Define transformation ratio and KVA rating of single phase transformer.

j) State type of single phase induction motor used in following application.
i) Food mixer ii) Refrigerator.

k) State the function of term :
i) MCCB ii) ELCB.

l) State advantages of three phase circuit.

P.T.O.

Marks

2. Attempt **any four** of the following : **16**

a) Describe two different types of enclosures.

b) State applications of sodium vapour lamps.

c) Compare capacitor start induction motor and universal motor.

d) Define efficiency, voltage regulation of transformer. Two transformer A and B have voltage regulation of 5% and 10% respectively. Which transformer is better and why ?

e) Three identical coils each of $R = 4\,\Omega$ and $C = 100\,\mu F$ connected in star across 415V, $3\,\phi$, 50Hz supply. Calculate Vph, Iph, power factor, total power absorbed.

f) Define frequency, phase, maximum value of alternating quantity.

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

a) State first aid measure to be given to person who has received electric shock.

b) Explain with block diagram speed control of induction motor by variable frequency drive method.

c) Draw circuit diagram of direct on line starter.

d) What are different types of safety tools used in electrical ?

e) i) Draw neat labelled diagram for single phase transformer.

ii) Write the e.m.f. equation of transformer and state the meaning of each term in it also state their units.

f) Describe the concept of 3-phase transformer and auto transformer.

SECTION – II

4. Attempt **any four** of the following : **16**

a) Draw symbols of FET, BJT, photodiode and optocoupler.

b) Draw block diagram of regulated power supply. State function of each block.

c) State Barkhausen's criteria of oscillations. List different types of oscillators.

d) What is rectifier ? Describe the working of half wave rectifier with circuit diagram and waveforms.

Marks

e) Compare CB, CE and CC configuration (4pts).

f) Draw the symbols of following gates :
   i) AND
   ii) OR
   iii) NDT
   iv) XOR

5. Attempt **any three** of the following : **18**

a) Compare
   i) BJT with FET (3pts)
   ii) Define intrinsic and extrinsic semiconductors.

b) Draw and explain circuit of full wave bridge rectifier with C filter and draw its input and output waveforms.

c) Draw the block diagram of OP-AMP and explain each block of it.

d) What is universal gate ? Design basic gates using NAND universal gate.

6. Attempt **any four of** the following : **16**

a) Describe the working of zener diode as a voltage regulator.

b) Explain working principle of PN junction diode in forward and reverse bias condition.

c) Draw and explain working of crystal oscillator.

d) Convert the following :
   i) $(32)_{10} = (?)_2$
   ii) $(99)_{BCD} = (?)_2$

e) Draw circuit diagram of RC coupled amplifier and show its frequency response with proper notations.

f) Draw symbols and truth table of :
   i) NDR gate
   ii) NAND gate.