

17404

11920

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any TEN of the following :

20

- (a) Define (i) frequency (ii) time period.
- (b) Give the difference between AC and DC supply. (any two points)
- (c) State working principle of PMMC meter.
- (d) Write any two applications of D.C. series motor.
- (e) Define transformation ratio of a transformer, write equation for it.
- (f) State the types of transformers on the basis of construction.
- (g) Name any two safety devices used in electric wiring.
- (h) State any four types of tariffs used in electricity billing.
- (i) State two applications of universal motor.
- (j) Write the meaning of slip w.r.t. a 3 ph induction motor.
- (k) State types of enclosures for electric motors.
- (l) Name any two electrical machines used in electro-agro system.

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P.T.O.

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

- (a) Define following terms used in A.C. circuits :
 - (i) Cycle
 - (ii) Rms value
 - (iii) Phase difference
 - (iv) Average value
- (b) Draw single line diagram of electrical power system and show different stages.
- (c) Draw and explain torque-armature current characteristics of D.C. shunt motor.
- (d) Differentiate between PMMC and MI type meters (any four points).
- (e) An A.C. voltage of $v(t) = 230 \sin 314 t$ volts is applied to a circuit. Calculate
 - (i) Angular frequency
 - (ii) Frequency
 - (iii) RMS value
 - (iv) Average value
- (f) Compare two winding transformer and auto transformer.

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

- (a) Explain with neat diagram working of dynamometer type wattmeter.
- (b) Explain direct loading test on single phase transformer with neat circuit diagram.
- (c) Compare shell type and core type transformer on the basis of construction.
- (d) Draw schematic diagram of single phase capacitor start-run induction motor.
- (e) Write factors for selection of motor for electric drives.
- (f) State any four advantages of LED over CFL.

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

- (a) A balanced delta connected load supplied with 440 V, 50 Hz, three phase a.c. supply has $R = 10 \Omega$ and $L = 0.6 \text{ mH}$ in its each arm.

Calculate :

- (i) phase current (ii) line current
- (iii) impedance per phase (iv) active power
- (b) A 6 pole, 3 phase induction motor operates from a supply whose frequency is 50 Hz. Calculate :
- (i) synchronous speed of motor
- (ii) the speed of the rotor when slip is 0.04.
- (c) Derive the emf equation of transformer.
- (d) Explain process of electroplating.
- (e) Compare resistance welding with arc welding.
- (f) Explain any two types of enclosures used for electric motors.

5. Attempt any FOUR of the following : **$4 \times 4 = 16$**

- (a) State necessity of earthing. Explain any one type of earthing.
- (b) Write down any four points of differentiation of star and delta connection.
- (c) State two application of each :
- (i) shaded pole motor
- (ii) capacitor start capacitor run motor
- (d) Explain any one PF improvement method.
- (e) State advantages of electric heating over the other types of heating methods.
- (f) State working principle and specification of stepper motor.

P.T.O.

6. Attempt any **FOUR** of the following :

4 × 4 = 16

- (a) Draw a circuit diagram of D.O.L. starter for three phase induction motor.
- (b) Explain any one type of fire extinguisher.
- (c) Calculate active and reactive power drawn from 230 V, 50 Hz, ac supply when it is loaded by a series circuit consisting of resistance of 10 Ω and a capacitor of 200 mFd.
- (d) Explain operation of universal motor on A.C. and D.C. supply.
- (e) State working principle of alternator. State the meaning self and separate excitation.
- (f) Explain construction and working of shaded pole induction motor.
