



# 17524

**15162**

**3 Hours / 100 Marks**

Seat No.

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- Instructions :**
- (1) *All questions are compulsory.*
  - (2) *Illustrate your answers with neat sketches wherever necessary.*
  - (3) *Figures to the right indicate full marks.*
  - (4) *Assume suitable data, if necessary.*
  - (5) *Preferably, write the answers in sequential order.*

**Marks**

1. A) Attempt **any three** of the following : **12**
- a) Define : (i) EMF (ii) Current (iii) Resistance state their units.
  - b) Why single phase induction motor is not self starting ?
  - c) Name the electrical accessories used in electric circuits and draw their symbols.
  - d) Compare intrinsic and extrinsic semiconductor on :
    - i) purity
    - ii) doping
    - iii) type
    - iv) conductivity
- B) Attempt **any one** of the following : **6**
- a) Derive an emf equation of 1-phase transformer.
  - b) Draw and explain in brief the wiring diagram of (i) Head light (ii) Horn (ii) Stop light
2. Attempt **any four** of the following : **16**
- a) State Faraday's laws of electromagnetic induction.
  - b) Explain in brief the construction and working of resistance split phase induction motor.
  - c) Explain in brief with suitable wiring diagram.
    - i) Turn indicator
    - ii) Wind shield wiper
  - d) Draw and explain the construction of P-N junction diode.
  - e) Explain the working of half wave rectifier with suitable circuit diagram. Also draw the waveforms of half wave rectifier.
  - f) Draw and explain the block diagram of general measurement system.

**P.T.O.**



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

16

- a) Define : (i) Active power (ii) Reactive power (iii) Apparent power. Draw power triangle.
- b) i) State the working principle of D.C. motor ii) State the necessity of filter.
- c) Define : (i) Accuracy (ii) Precision (iii) Sensitivity (iv) Reliability
- d) Explain the dynamic characteristics of measuring system.
- e) State the difference between analog signal and digital signal.

4. A) Attempt **any three** of the following :

12

- a) Define : (i) RMS value (ii) Average value (iii) Form factor (iv) Peak factor with respect to an alternating waveform.
- b) Compare core type and shell type transformer on any four points.
- c) Explain in brief the insulated and ground return system.
- d) State and explain the working principle of operation of transducer.

B) Attempt **any one** of the following :

6

- a) Explain the construction and working of SCR. Draw the V-I characteristics of SCR.
- b) State the classification of logic gates. Draw the symbols and truth tables of any three logic gates.

5. Attempt **any four** of the following :

16

- a) A resistance of 10 ohm is connected in series with two resistances each of 15 ohm arranged in parallel. The above combination is connected across 20 V supply. Calculate :  
(i) Req. (ii) Total current
- b) State the types of stepper motor. Explain any one of them in brief.
- c) Compare positive and negative return system on any four points.
- d) Draw symbols of photodiode and LED. Also state the applications of both.
- e) Compare electrical and mechanical instruments on any four points.
- f) State the meaning of flip flop. Draw the symbols and truth tables of RS and D flip flop.

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

16

- a) A 1-phase transformer has 500 turns in the primary and 1200 turns in the secondary winding. The cross sectional area of the core is 80 sq. cm. If the primary winding is connected to a 50 Hz supply at 500 V. Calculate : (i)  $\phi_m$  (ii)  $B_m$  (iii)  $V_2$
- b) Compare PNP and NPN transistor on the basis of  
(i) Symbol (ii) Direction of emitter current (iii)  $V_{CE}$  (iv) Application.
- c) Explain LVDT with neat sketch.
- d) Draw and explain the construction and working of thermister. Draw characteristics of it.
- e) Explain the working of seven segment LED display.