22310

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3 Hours / 70 Marks Seat No. | | | | | | | | |

15 minutes extra for each hour

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

SECTION - I

1. Attempt any SIX of the following. **12**

a) Define :

(i) Electric circuit

(ii) Magnetic circuit

b) State the meaning of "Magnetic Hysteresis".

c) Define :

(i) Peak factor

(ii) Form factor

d) In a simple AC series circuit, voltage is leading current by 30°. State the nature of circuit and compute circuit power factor.

e) Define : Transformer.

f) State the principle of electromagnetic induction.

g) State four types of single-phase induction motor.

Marks

2. Attempt any THREE of the following. **12**

a) Draw a neat phasor diagram and derive relationship between line voltage and phase voltage in balanced star connection.

b) An alternating voltage is given by,

$v = 200 \sin(314.2t)$ volt

Determine :

(i) Peak voltage

(ii) Frequency

(iii) Time period

(iv) Voltage magnitude at t = 15 msec.

c) Describe with neat sketch, the working principle of an autotransformer

d) With neat sketch, explain difference between Core-type transformer and Shell-type transformer.

3. Attempt any TWO of the following. **12**

a) Explain the phenomenon of

(i) Statically induced emf

(ii) Dynamically induced emf

State the laws used to identify the direction or polarity of above types of emfs.

b) i) A coil having resistance of 50 Ω and an inductance of 0.2 H is connected to 1-phase, 230 V, 50 Hz AC supply.

Determine 4

(1) Inductive reactance

(2) Impedance

(3) Coil current

(4) Power consumed by the coil

ii) What is Universal motor ? 2

c) With neat sketch, describe the construction and working principle of single-phase induction motor. Give its two applications.

Marks

SECTION - II

4. Attempt any FIVE of the following. **10**

a) Define :

(i) Active component

(ii) Passive component

b) State any two parameters of a signal and also state their meaning.

c) State significance of filter in electronic circuits.

d) Draw symbol of zener diode and state its unique feature which differs it from ordinary diode.

e) Draw construction and symbol of PNP-type transistor.

f) Draw circuit diagram of CB configuration.

5. Attempt any THREE of the following. **12**

a) Distinguish clearly between Ideal and Practical voltage source with the help of their characteristic curves.

b) Distinguish clearly between Analog IC and Digital IC.

c) With the help of characteristic diagram, explain various operating regions of transistor.

d) Define current gains Alpha (α) and Beta (β) of transistor configurations and derive relation between them.

6. Attempt any TWO of the following. **12**

a) With neat constructional sketch, explain the working of Light Emitting Diode (LED)

b) With the help of neat circuit diagram, explain working of bridge type rectifier. Draw input-output voltage waveforms.

c) (i) Explain how to obtain value of given resistor using colour code. 3

(ii) Explain how to obtain value of given capacitor using colour code 3