

22225

22232

3 Hours / 70 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) State different types of signals. Draw any one type of signal.
- (b) Draw symbol of (i) P-N junction diode, (ii) Zener diode.
- (c) Define transistor parameter 'alpha-  $\alpha$ ' and Beta ' $\beta$ '.
- (d) Draw symbol of (i) N-channel Depletion MOSFET, (ii) N-channel Enhancement MOSFET.
- (e) Draw symbol of fixed capacitor and variable capacitor.
- (f) Define transducer and name any two active transducer.
- (g) Differentiate between sensors & transducer. (any two points)



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

- (a) Define voltage source. Draw and explain ideal & practical characteristics of voltage source.
- (b) Draw half-wave rectifier with 'π' filter. Also draw its input & output wave form.
- (c) Draw the sketch or block diagram of a regulated power supply. State the function of each block.
- (d) Describe the working principle of n-p-n transistor with the help of diagram.

**3. Attempt any THREE of the following : 12**

- (a) Sketch the construction of N-channel Enhancement MOSFET & explain its working principle.
- (b) Draw a sketch & describe working of a pressure transducer.
- (c) State the different types of resistors. State any six specifications of resistors.
- (d) With the help of circuit diagram, explain how transistor works as a switch.

**4. Attempt any THREE of the following : 12**

- (a) Explain any four selection criteria of transducer for temperature measurement.
- (b) Explain the working of zener diode as a voltage regulator.
- (c) Draw C-E configuration. Explain its input & output characteristics.
- (d) When  $V_{GS}$  of FET changes from '-3.1' V to '3' V, the drain current changes from 1 mA to 1.3 mA. What is the value of trans conductance ?

- (e) Draw output waveform of full wave rectifier. State the expression of their following performance factor.
- PIV
  - Ripple factor
  - Efficiency

5. Attempt any TWO of the following :

12

- Draw a sine waveform whose wavelength is 400 nm and amplitude – 2 V, using appropriate scaling of parameters.
  - For given triangular wave determine its amplitude & frequency. (Fig. a)

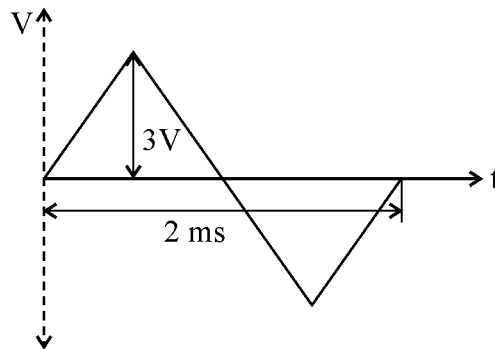


Fig. a

- Define operating point & DC load line of transistor.
  - Calculate  $I_E$  in a transistor for which  $\beta = 50$  &  $I_B = 20$  mA.
- In full wave rectifier  $V_M = 5$  V,  $R_L = 5$  K $\Omega$ . Find out  $V_{DC}$ ,  $I_{DC}$ , Ripple factor & PIV.

6. Attempt any TWO of the following :

12

- (a) Differentiate between JFET & MOSFET (any **six** points).
  - (b) Differentiate between Cutoff region, Active region and Saturation region of transistor with respect to following parameters.
    - (i) Circuit diagram
    - (ii) Characteristics
    - (iii) ON-OFF status of emitter diode and collector diode.
    - (iv) Application
  - (c)
    - (i) Differentiate between active transducers and passive transducer.
    - (ii) Differentiate between sensors and transducers.
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