22232

3 Hours / 70 Marks   Seat No.

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)   Use of Non-programmable Electronic Pocket Calculator is permissible.

(7)   Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(8)   Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1.   Attempt any FIVE of the following :   **10**

(a)   List the types of biasing of BJT. Which type of biasing is used mostly ?

(b)   Define thermal runaway.

(c)   Draw neat symbol of E-MOSFET and D-MOSFET.

(d)   What is coupling ? List the types of amplifier coupling ?

(e)   State Barkhausen's criteria for sustained oscillations.

(f)   List four applications of wave shaping circuits.

(g)   Define Line regulation and Load regulation.

2. Attempt any THREE of the following : 12

(a) Draw the input and output characteristics of BJT in CE configuration and define the parameters input resistance and output resistance.

(b) Compare BJT and FET (any four points).

(c) Single transistor is operating as an ideal class B amplifier with 1 kΩ load. A dc meter in the collector reads 10 mA. How much signal power is delivered to the load ?

(d) Draw and explain the working of UJT relaxation oscillator with neat diagram.

3. Attempt any THREE of the following : 12

(a) Derive the relation between current amplification factor in CE and CB transistor configuration.

(b) Describe the working principle of E-MOSFET with neat diagram.

(c) Explain the operation of class-B push pull amplifier with neat diagram.

(d) The negative half cycles are to be clipped from the given input signal v_i = 10 sin wt, name and draw the circuit with input-output waveform.

4. Attempt any THREE of the following : 12

(a) Define the terms with respect to JFET :

(i) Pinch-off voltage

(ii) DC drain resistance

(iii) Transconductance

(iv) Amplification factor

(b) Explain the working principle of PNP transistor with suitable diagram.

(c) Draw the neat sketch of single stage BJT CE amplifier and explain the concept of phase reversal in this amplifier.

(d) The ac equivalent circuit of a crystal has these values : L = 1H, C = 0.01 pF.

R = 1000 Ω and C_{in} = 20pF. Calculate Fs and Fp of the crystal.

(e)
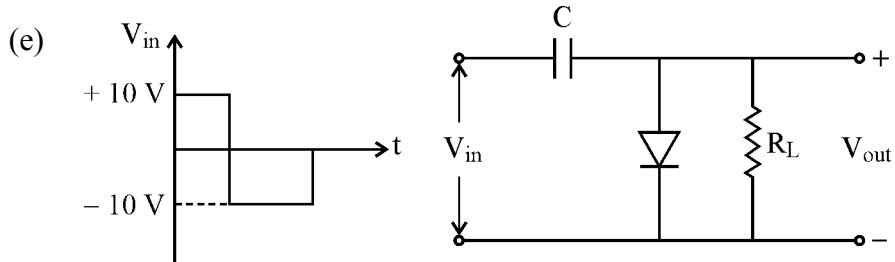
Sketch the wave shape of clamped output and name the above clamping

circuit.

5. **Attempt any TWO of the following :**   **12**

(a) Design a complete regulated power supply to give – 12 V regulated output

using IC 79XX. Write the function of rectifier and filter circuit used in the

circuit.

(b) State the need of biasing of the transistor. Draw circuit diagram of voltage

divider bias and write the function of each component.

(c) Calculate voltage gain A_F and input resistance R_{iF} in voltage series negative

feedback amplifier. The voltage gain without feedback A = 500, input

resistance without feedback R_i = 3 kΩ and feed back factor β = 0.01. Draw

the block diagram of voltage series feedback connection.

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

   (a)   Draw circuit diagram and frequency response of RC coupled amplifier. Write its drawbacks.

   (b)   Draw circuit diagram of RC integrator for a sinusoidal input. Derive the expression for output voltage. Draw the output waveform if the same circuit is connected to a rectangular wave generator.

   (c)   Draw the circuit of transistorised shunt voltage regulator and explain its working. Write any two drawbacks of this regulator.

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