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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. a) **Attempt any <u>SIX</u> of the following :**   12

    i)   List various transistor biasing method.

    ii)   Define α of Transistor.

    iii) State the need of cascade amplifier.

    iv)   Define intrinsic stand off ratio for UJT.

    v)   Define operating principle of tuned circuit.

    vi)   List the types of power amplifiers.

    vii) State the effect of V_{GS} on channel conductivity of N-channel JFET.

    viii) Draw the circuit diagram of bootstrap time base generator.

Marks

b) **Attempt any TWO of the following :** 8

   i)   Draw the circuit diagram of CB configuration, and Draw output characteristic with different regions.

   ii)   Draw circuit diagram of fixed voltage bias-method and describe its working.

   iii) Draw functional block diagram of IC 723 and write the function of IC 723.

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

a)   State the need for biasing in transistor, List any two method.

b)   Draw the circuit diagram of voltage divider bias method and describe its working.

c)   Draw the construction of N-channel JFET and explain its working.

d)   What is amplifier ? Give the classification of amplifier.

e)   State effect of negative feed back on voltage gain, bandwidth, I/P impedance, O/P impedance.

f)   Draw the block diagram of regulated power supply. Write the function of each block.

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

a)   Compare CB, CE, CC of BJT with reference to following point.
    i)   I/P impedance
    ii)   Current gain
    iii) O/P impedance
    iv) Voltage gain

b)   Explain how JFET acts as voltage controlled device ?

c)   State the Barkhausen criterion for the generation of sustained oscillations and draw block diagram of an oscillator.

d)   Draw frequency response of direct coupled amplifier. Discuss its advantages and disadvantages.

e)   State the working principle of 79XX series voltage regulator with diagram.

f)   Draw the circuit diagram of series transistor voltage regulator and describe its operation.

Marks

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

a) Draw the symbol and construction of N-Channel JFET.

b) Draw the circuit diagram of double tuned amplifier and sketch the frequency response.

c) Compare BJT and JFET with reference to following point.

  i) Symbol

  ii) Transfer characteristic

  iii) I/P impedance

  iv) Application

d) Draw circuit diagram of complementary symmetry class B push pull power amplifier and describe its operations.

e) Compare small signal amplifier and power amplifier for two points.

f) Draw the V-I characteristics of U.J.T. and label it.

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

a) In CE configuration if $\beta = 99$ leakage current $I_{CEO} = 50 \ \mu A$ if base current is 0.5 mA, Determine I_C and I_E.

b) Compare RC oscillator and crystal oscillator with reference to following point.

  i) Frequency stability

  ii) Example

  iii) Application

  iv) Frequency formula

c) Draw circuit diagram of single stage class A amplifier and describe its working.

d) List four applications of FETs.

e) Draw the circuit diagram of crystal oscillator, and give the basic principle of piezoelectric crystal.

f) Describe the working of zener diode as a voltage regulator.

Marks

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

a)   Derive the relation between α and β of transistor.

b)   Describe the working principle of UJT as a relaxation oscillator with neat circuit diagram.

c)   Compare negative and positive feed back effect with respect to

   i)   Gain

   ii)   BW

   iii) Zi

   iv)   Zo

d)   Compare single tuned and double tuned circuit from following point.

   i)   Selectivity

   ii)   Q-factor

   iii) Bandwidth

   iv)   Response of Gain Vs frequency

e)   State need of voltage regulator. Define load and line regulation.

f)   Draw miller sweep generator and give any two applications.

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