

**V.P. & R. P. T. P. SCIENCE COLLEGE**  
**VALLABH VIDYANAGAR**  
**S.Y. B. Sc. THIRD SEMESTER**

**PHYSICS US03CPHY02 First Internal test**

**Marks 30**

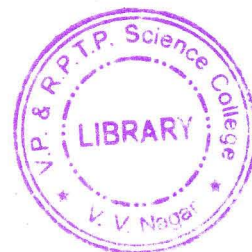
**Date: 01/10/2013 Tuesday**

**Time: 1.00 to 2.30 p.m.**

**Q: 1 Multiple Choice Questions.**

**[6]**

- 1 The Q point in a voltage amplifier is selected in the middle of the active region because
  - (i) it gives a distortionless output
  - (ii) it requires a small dc voltage
  - (iii) the operating point becomes stable
  - (iv) none
- 2 Generally, negative clipping can be observed if the operating point is
  - (i) near saturation region
  - (ii) near cut-off region
  - (iii) at middle of active region
  - (iv) none of these
- 3 Which of the following h-parameter defines input impedance of a CE transistor?
  - (i)  $h_{ii}$
  - (ii)  $h_{ie}$
  - (iii)  $h_{fe}$
  - (iv)  $h_{in}$
- 4 With increase in frequency, the capacitive reactance
  - (i) decreases
  - (ii) increases
  - (iii) do not change
  - (iv) becomes infinite
- 5 Due to negative feedback in an amplifier, the voltage gain stability
  - (i) increases
  - (ii) decreases
  - (iii) remains same
  - (iv) none of above
- 6 One of the effects of negative feedback in amplifier is to
  - (i) increase the noise
  - (ii) increase the harmonic distortions
  - (iii) decrease the bandwidth
  - (iv) decrease the harmonic distortions



**Q: 2 Answer in short (Any three).**

**[6]**

1. What is operating point? Explain.
2. Draw the diagram of collector-to-base bias circuit.
3. Draw the Ac equivalent circuit of a CE transistor and explain its components.
4. Explain the difference between dc load line and ac load line.
5. What is feedback? Discuss types of it.
6. An amplifier with  $Z_i = 1k\Omega$  has a voltage gain  $A = 1000$ . If a negative feedback of  $\beta = 0.01$  is applied to it. What shall be the input impedance of feedback amplifier?

**Q:3** Explain determination of operating point of a Fixed bias circuit. Determine operating point for a Fixed bias circuit consisting of a NPN germanium transistor with  $\beta = 50$ ,  $V_{CC} = 9V$ ,  $R_C = 2k\Omega$  and  $R_B = 300k\Omega$ , and show it graphically. **[6]**

OR

**Q:3** What is Voltage divider biasing circuit? Using accurate analysis method (Thevenised circuit) explain determination of operating point of such circuit. **[6]**

**Q:4** What are h-parameters? Explain development of h-parameter equivalent circuit of a CE transistor. **[6]**

OR

**Q:4** What are small-signal amplifiers? Draw the circuit of such amplifier and discuss function of each component. State its performance parameters and define its gain. **[6]**

**Q:5** Derive the expression of voltage gain of a negative feedback amplifier. Calculate the gain of such a negative feedback amplifier with an internal gain  $A = 100$ , and feedback factor  $\beta = 1/10$ . **[6]**

OR

**Q:5** Explain the effect of negative feedback on (i) input impedance and (ii) bandwidth of the amplifier. **[6]**