

**QP Code : 1100**

Duration : 3 hours

Max marks: 100

N.B.:

1. Q 1 is compulsory
2. Answer **any four** out of remaining six questions
3. Assumptions made should be clearly stated
4. Assume any suitable data wherever required but justify the same
5. Figures to the right indicate marks
6. Illustrate answers with sketches wherever required

- Q.1 (A) Describe the principle of operation and applications of Photo-voltaic devices. (05)
- (B) Explain the operation of voltage doubler circuits with the help circuit and waveforms at relevant points. (05)
- (C) Describe the effect of negative feedback on frequency response of a BJT amplifier (05)
- (D) What are the various factors or reasons which causes the reduction in voltage gain at low and high frequency of operation of a JFET amplifier? Explain each of them briefly. (05)
- Q.2 (A) Explain the voltage divider biasing method for a BJT common emitter amplifier. Explain the placement of operating point (Q-point) of above amplifier with the help of load line and its impact on output waveform (04)
- (B) Draw a full-wave bridge rectifier circuit with CLC filter and describe the circuit operation with waveforms. Compare the performance of C, L and LC filters. (08)
- (C) State and describe the operation of various biasing methods used for JFET amplifiers. (08)
- Q.3 (A) Compare the following (Any Two) (06)
- (i) JFET and MOSFET
  - (ii) Photo-conductive and Photo-emissive devices
  - (iii) Single ended amplifiers and Differential amplifiers
- (B) Describe the following in reference to a BJT amplifier (14)
- (i) Stability factor
  - (ii) Thermal runaway
  - (iii) Thermal compensation
  - (iv)  $r_e$  model
  - (v) Frequency response
- Q.4 (A) Draw the h-parameter equivalent model for a CE BJT amplifier with voltage divider bias network. Derive the expressions for input impedance, output impedance, voltage gain and the current gain of the given amplifier. (10)
- (B) Draw the small signal equivalent circuit of a common source JFET amplifier and derive the expression for voltage gain and output impedance. (10)
- Q.5 (A) Give one example each of BJT amplifiers with voltage-shunt and current-series negative feedback. Also explain how the negative feedback affects their performance. (10)
- (B) Explain the working of Varactor diode and Zener diode. Also state and describe one application for each. (10)
- Q.6 (A) Draw the circuit diagram of a single input unbalanced output BJT differential amplifier and derive the relevant AC parameters for it. (10)
- (B) Explain how to estimate the lower cutoff frequency for the BJT amplifier? What are different ways by which higher cut off frequency can be enhanced? Explain briefly (10)
- Q.7 Write short notes on **any four**. (20)
- (i) Clipper and clamper circuits
  - (ii) Photo transistor and its applications
  - (iii) Hybrid-pi model of a BJT amplifier
  - (iv) FET differential amplifier