17321

11718

3 Hours / 100 Marks Seat No. | | | | | | | | |

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

Marks

1. Attempt any TEN of the following : **20**

(a) Define Knee Voltage (V_{Knee}) and give the values of (V_{Knee}) for Si and Ge diode.

(b) Draw symbols of EX OR, EX NOR gate and give the truth table for the same.

(c) Define Depletion region and Barrier voltage of PN junction.

(d) Define ripple factor and PIV of diode.

(e) State any four advantages of LC filter.

(f) State the applications of digital electronics.

(g) Draw symbols of Schotty-diode and varactor diode.

(h) Define pinch off voltage and drain resistance of FET.

(i) What is regulator ? State its need.

(j) Draw circuit diagram of RC phase shift oscillator.

(k) Define load and line regulation.

(l) Enlist names of regulator IC's.

(m) Define biasing of transistor.

(n) Define negative and positive feedback.

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

(a) Draw circuit of Zener diode as voltage regulator and explain its working.

(b) Describe operation of N-channel JFET.

(c) Describe operation of voltage divider biasing with proper circuit diagram.

(d) Draw circuit diagram of class A push pull amplifier and describe its operation.

(e) Describe operating principle of LASER diode.

(f) Describe transistor as a switch with neat circuit diagram.

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

(a) Describe working principle of LED with diagram.

(b) Define α and β and derive relation between (α) and (β) of transistor.

(c) Compare BJT & FET on the basis of

(i) Bipolar / Unipolar

(ii) Thermal Runaway

(iii) Noise

(iv) Applications

(d) 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.

(e) Draw full wave rectifier (center tap) with LC filter and draw input and output voltage waveform.

(f) Draw $V_E - I_E$ characteristics of UJT and describe different regions on the characteristics.

4. Attempt any FOUR of the following : 16

(a) Draw CE configuration of NPN transistor and sketch output characteristics.

(b) Draw the block diagram of microprocessor and state the function of each block.

(c) State the effects of coupling and emitter bypass capacitor on bandwidth.

(d) Describe operation of N channel enhancement type MOSFET with diagram.

(e) Draw circuit diagram of Hartley oscillator and give the function of each component.

(f) Draw forward and reverse characteristics of zener diode with neat circuit diagram.

5. Attempt any FOUR of the following : 16

(a) Describe operation of transistorized shunt voltage regulator with neat circuit diagram.

(b) Draw circuit diagram of colpitts oscillator, colpitts oscillator has C_1 = 250 PF, C_2 = 100 PF & L = 60 μH. Find the value of frequency of oscillation.

(c) Why NAND gate is called universal gate, implement OR, AND using NAND gate.

(d) Compare CB, CE and CC config on the basis of

(i) I/P impedance

(ii) Current gain

(iii) Voltage gain

(iv) Output impedance

(e) Construct a dual power supply capable of supplying ± 12 V using 78 XX & 79 XX IC's.

P.T.O.

(f) Define the term w.r.t. transistor

(i) DC load line

(ii) Operating point

6. Attempt any FOUR of the following : 16

(a) State the concept of feedback and Barkhausen criteria in oscillator.

(b) Draw circuit diagram of RC coupled amplifier and describe its operation.

(c) Draw frequency response of single stage CE amplifier and explain why the gain of an amplifier falls at low and high frequency.

(d) What do you mean by thermal runaway and how it should be avoided ?

(e) Draw drain characteristics of FET showing different operating regions and briefly describe each region.

(f) Compare half wave, center tap FWR, bridge FWR on the basis of

(i) Ripple factor

(ii) Rectifier efficiency

(iii) TUF

(iv) Waveforms