

PIET's College of Engineering, Pune -5
End semester Examination
(ET 101) Basic Electronics

Programme: F.Y.-B.Tech.
Year:2005-06

Duration: 3 Hrs.
Max.Marks: 60

Instructions to candidates:

- 1) Solve any two out of A, B, C in each of all six questions.
- 2) Assume suitable data wherever necessary.
- 3) Figures to the right in bracket indicate marks.
- 4) Draw neat labeled figures wherever required.

Q.1 (A) State and prove De Morgan's laws of Boolean algebra. (5)
Draw a simplified gate/logic diagram for the following expression-

$$X = (\overline{AB} \cdot A) \cdot (\overline{AB} \cdot B)$$

Q.1 (B) Draw a connection diagram to represent 3 bit ripple counter using T-Flip-flop. What is the modulus of this counter? What frequency division would occur at the output of the second flip-flop? (5)

Q.1(C) What is a J-K flip-flop? Explain its advantage over R-S flip-flop. Write its truth table. (5)

Q.2 (A) Explain in brief the following applications of a BJT- (5)
(i) Used as a switch, (ii) Used as a voltage amplifier.

Q.2 (B) Define α and β for a transistor and derive the relation between them. (5)
If β is measured to be 49, what is the value of α ?

Q.2 (C) Draw a circuit diagram for RC coupled single stage CE amplifier. State the purpose of each component drawn in the circuit diagram.State its application. (5)

Q.3 (A) Write a short note on IC voltage regulators. Use LM 317 as an example. (5)

Q.3 (B) Compare light emitting diode, photodiode and p-n junction diode with respect to (5)
The following points:(i) Principle of operation,(ii)Materials used to manufacture,
(iii)Applications

- Q.3(C) Draw a circuit diagram of full wave rectifier with capacitor filter and relevant waveforms to explain its operation. (5)
- Q.4 (A) Explain in brief the following circuits using OPAMP- (5)
(i) Summing amplifier ,(ii) Difference amplifier
- Q.4 (B) What is negative feedback for amplifier? Derive the expression for a gain of an amplifier with negative feedback. (5)
- Q.4(C) With the help of transfer characteristics, explain an application of OPAMP connected in open loop mode. (5)
- Q.5 (A) State any four applications of CRO. Explain its operation with the help of block diagram. (5)
- Q.5 (B) What is a transducer? State where is it used? Explain the principle of operation of following: (i) LVDT, (ii) Thermocouple, (iii) Strain gauge. (5)
- Q.5 (C) Write short notes on- (5)
(i) FAX, (ii) PA system
- Q.6 (A) State Barkhausen's criteria for generating oscillations. Draw a circuit diagram of Wein bridge oscillator. (5)
- Q.6 (B) Draw the circuit diagram of astable multivibrator using IC 555 with $R_A = 6.8K\Omega$, (5) $R_B = 3.3K\Omega$ and $C = 0.1\mu F$
- Q.6 (C) Describe the operation of the most stable high frequency oscillator. Write its frequency expression. (5)