

TEC-301

1206

Odd Semester Examination, 2017-18

B.TECH. (SEMESTER-III)

ELECTRONIC DEVICES AND CIRCUITS

Time : 3.00 Hours

Max Marks : 100

1. Attempt **any four** of the following :

[5X4=20]

- (a) What is an oscillator? What is the barkhausen criterion for oscillations?
- (b) Distinguish ferromagnetic, ferrimagnetic and antiferromagnetic. Give an example of each class of material.
- (c) Explain the concept of feedback with its types.
- (d) A transistor has $I_E=5\text{mA}$, $I_C=4.95\text{mA}$, $I_{CEO}=200\text{ }\mu\text{A}$, calculate P_{dc} & leakage current I_{CBO} .
- (e) Derive the relation between volume density and lattice constant.
- (f) Draw the circuit diagram of double tuned amplifier and explain briefly.

2. Attempt **any four** of the following :

[5X4=20]

- (a) The gain of the amplifier is 100 with its bandwidth 10 KHZ. If 10% of negative feedback is applied in the basic amplifier, determine the feedback gain and new bandwidth of the amplifier.
- (b) Describe how oscillations are developed in a tank circuit.
- (c) Why space charge region is called as depletion region? Which type of carriers is present in the space charge region?
- (d) Draw & explain Ebers-Moll model of a transistor.
- (e) Derive the relation between α and β of the transistor.

3. Attempt **any two** questions :

[10X2=20]

- (a) Draw the functional block diagram of a stable multivibrator with IC555 timer & explain its operation with wave forms.

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(b) Draw the circuit diagram of RC coupled amplifier. Explain its operation with its frequency response curve, advantages & disadvantages.

(c) (i) State any four advantages of negative feedback in amplifiers.

(ii) In an amplifier with negative feedback, the gain of the basic amplifier is 100 & it employs a feedback factor of 0.02. If the input signal is 40 mV. Determine

a. Voltage gain with feedback

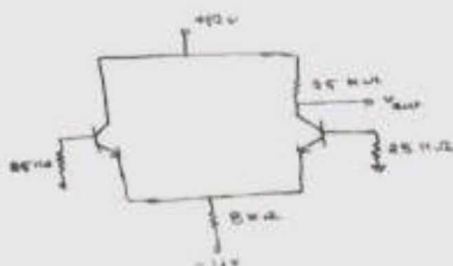
b. Value of output voltage.

4. Attempt any two questions :

[10x2=20]

(a) In the differential amplifier circuit shown below, the transistors have identical characteristics & Here $\beta=100$

Determine (i) output voltage (ii) Base current and (iii) the base voltage taking into account the effect of R_B and V_{BE} . Take $V_{BE}=0.7$ Volts.



(b) Draw the electrical equivalent circuit of quartz crystal & describe its electrical characteristics

(c) Explain Darlington amplifier with circuit diagram & find the expression of input impedance output impedance, voltage gain, current gain for it

5. Attempt any two questions :

[10x2=20]

(a) Draw the circuit of a wein bridge oscillator and explain its working why is negative feedback employed in this circuit in addition to the usual positive feedback.

(b) Explain the function of direct coupled & transformers coupled amplifier and also differentiate between them

- (c) Explain why the conductivity of a pure semiconductor increases with temperature when does an intrinsic semiconductor behaves as an insulator? What is a hole in a semiconductor & how is it formed.
