Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 30139

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Third Semester

Electronics and Communication Engineering

EC 3353 – ELECTRONIC DEVICES AND CIRCUITS

(Common to Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Define break down voltage of Zener diode.

2.   Draw the symbols of Diode, Zener diode, BJT and UJT.

3.   Name the factors that affect stability of Q point of a Transistor Amplifier.

4.   What is the need for biasing in Transistor Amplifier?

5.   Mention the purpose of Differential Amplifier.

6.   Find the Q factor value of a tuned circuit with resonant frequency of 1600 kHz and bandwidth of 10 kHz.

7.   Define Piezoelectric effect.

8.   Name a low frequency and high frequency oscillator.

9.   What is a dc to dc converter?

10. Mention the operating point and conduction angle of Class A amplifier.

15. (a) With neat circuit diagram, derive the expression for output voltage of a buck-boost converter.

Or

(b) With neat circuit diagram, explain the working of class AB power amplifier using MOSFET and state the advantages of using MOSFET over BJT.

PART C — (1 × 15 = 15 marks)

16. (a) (i) A voltage series negative feedback amplifier has a voltage gain without feedback A = 500, input resistance R_i = 3 KΩ , output resistance R_o = 20 KΩ and feedback ratio $\beta = 0.01$. Calculate the voltage gain A_f input resistance R_{if} and output resistance R_{of} of the amplifier with feedback.   (6)

(ii) For the differential amplifier circuit shown in Fig. 16(a), assume β of both the transistors is very high. Find the value of V_{in2} for which current flowing through 2 kΩ resistor of transistor Q_2 is 1.8 mA. Assume thermal voltage V_T = 26 mV.   (9)
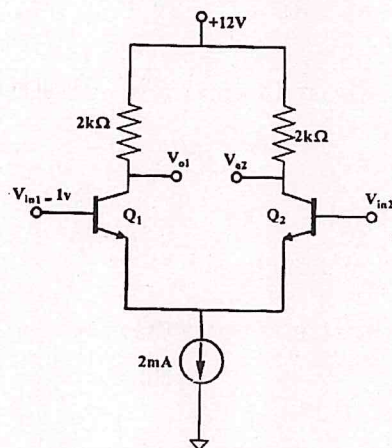

Fig. 16(a)

Or

(b) In a Colpitts oscillator, the values of the inductors and capacitors in the tank circuit are L = 40 mH, C_1 = 100 pF and C_2 = 500 pF

(i) Find the frequency of oscillations.

(ii) If the output voltage is 10 V, find the feedback voltage.

(iii) Find the minimum gain, if the frequency is changed by changing L alone

(iv) Find the value of C_1 for a gain of 10.

(v) Also, find the new frequency.   (15)