Electronic Circuits and Communication Fundamentals

Dec 17

Computer Engineering (Semester 3)

Total marks: 80
Total time: 3 Hours

INSTRUCTIONS
(1) Question 1 is compulsory.
*(2) Attempt any **three** from the remaining questions.*
(3) Draw neat diagrams wherever necessary.

1.a. What is the source of the leakage current in a transistor?
If the emitter current of a transistor is 8 mA and IBIB is 1/100 of ICIC,
determine the levels of ICIC and IBIB.   (5 marks)
1.b. Explain the concept of virtual ground in operational amplifiers.   (5 marks)
1.c. Draw the spectrum of amplitude modulated wave and explain its
 components.   (5 marks)
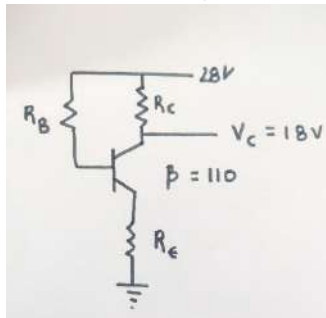**1.d.** Explain adaptive delta modulation.   (5 marks)

2.a. The emitter bias configuration as shown in following figure has
 the specifications:
.ICQ=14ICsat.ICQ=14ICsat .ICsat=8mA.ICsat=8mA
VC=18VVC=18V and ββ = 110
Determine RCRC, RERE and RBRB

                                                                                 (10 marks)

2.b. Explain the following parameters and their values for 741 op-amp
CMRR, slew rate, Gain Bandwidth Product, Input Offset Voltage
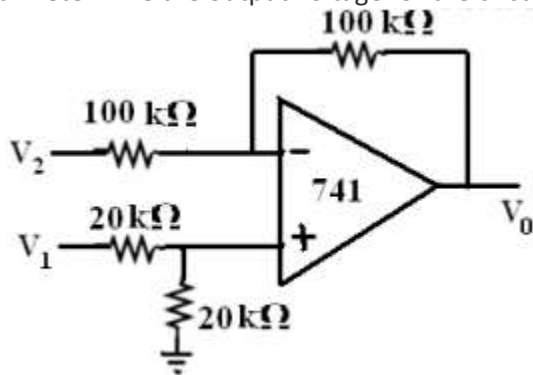and Output Resistance. (10 marks)

3.a. GIven $\beta\beta$ = 120 and IEIE = 3.2 mA for a common-emitter configuration with
r0= $\infty\Omega$r0= $\infty\Omega$, determine
i) ZiZi
ii) AvAv if a load of 2 k$\Omega\Omega$ is applied.
iii) AiAi with the 2k$\Omega\Omega$ load. (5 marks)
3.b. State and explain Barkhausens criteria for oscillations. (5 marks)
3.c. Explain principle of TDM. (5 marks)
3.d. Determine the output voltage for the circuit if V1V1 = 5V and V2V2 = 3V

(5 marks)

4.a. Draw the block diagram of phase cancelleation SSB generation and
explain how the carrier and unwanted sidebands are suppressed. (10 marks)
4.b. Draw the PAM, PPM and PWM waveforms in time domain assuming
a sinusoidal modulating signal. Explain them in brief. (10 marks)

5.a. State shannon's thorem on channel capacity.
What is the maximum capacity of a perfectly noiseless channel whose
bandwidth is 120 Hz, in which the values of the data transmitted may
be indicated by any one of the 10 different signal, explain them in brief. (10 marks)
5.b. With repect to neat diagram explain the elements of analog communication system.(10 marks)

6.a. What is Nyquist Criteria? What is its significance? (5 marks)
6.b. Give the proper definition for entropy and information rate. (5 marks)
6.c. Write short note on op-amp as comparator. (5 marks)
6.d. Differentiate between Class A and Class C power amplifiers with
respect to circuit diagram , operating cycle and power efficiency. (5 marks)