Roll No. ..... Total Pages : 3

015402

August/September 2022

B.Tech. (ENC/EEIOT) IVth SEMESTER

Analog Electronics Circuits (ECP-402)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What are the factors affecting stability of operating point of a transistor? (1.5)

(b) State Barkhausen criteria for sinusoidal oscillators. (1.5)

(c) Why does gain of amplifier falls off at low frequencies? (1.5)

(d) What is the basic difference between an FET and a BJT? (1.5)

(e) The RC network of Wein bridge oscillator consists of resistors and capacitors of values R = 220 kΩ and C = 250 pF. Calculate the frequency of oscillations. (1.5)

(f) How CMRR influence the performance of an op-amp? (1.5)

(g) Compare class A and class B amplifier. (1.5)

(h) An OP-AMP circuit is to have a 10 kHz triangular output waveform with a 12 V peak to peak amplitude. Calculate the OP-AMP minimum SR (Slew Rate). (1.5)

(i) What do you mean by a clamping circuit? (1.5)

(j) What is the difference between active and passive filters? (1.5)

PART-B

2. (a) Draw the circuit diagram of a bridge rectifier and explain its operation with wave-forms. Derive expression for its rectification efficiency and ripple factor. (7.5)

(b) With the aid of circuit diagram, explain R-C coupled amplifier. (7.5)

3. (a) Describe the voltage divider biasing circuit in detail. Define the stability factor and calculate its value. (7.5)

(b) The h-parameters of a transistor used in CE circuit are : hie = 1000 Ω, hre = 10^{-4}, hfe = 50 and hoe = 10^{-4} mho. The load resistor for the transistor is 1000 Ω in collector circuit. The transistor is supplied from a signal source of resistance 1000 Ω. Find the value of input impedance, output impedance, voltage gain. (7.5)

4. (a) Draw typical drain characteristics curves of a JFET. Explain the shape of these curves qualitatively. (7.5)

(b) Draw and explain the operation of an op-amp as low pass filter. (7.5)

5. (a) Show that maximum collector efficiency of class A transformer coupled power amplifier is 50%. (7.5)

(b) Draw schematic block diagram of the basic op-amp. Explain the significance of virtual ground in basic inverting amplifier. How would you explain its existence? (7.5)

6. (a) Explain with the aid of circuit diagram, the working of a transistor RC phase shift oscillator. (7.5)

(b) Explain how OP-AMP can be used as a zero crossing detector. (7.5)

7. Write a short note on the following :

(a) Voltage multiplier circuits.

(b) Wein Bridge oscillator. (15)
