

USN

--	--	--	--	--	--	--	--	--	--	--	--

10ES32

Third Semester B.E. Degree Examination, Dec.2016/Jan.2017
Analog Electronic Circuits

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Explain the static and dynamic resistance of the diode. (04 Marks)
b. For the circuit shown in Fig. Q1 (b). Find I_D , V_1 , V_2 and V_0 . Assume silicon diode. (08 Marks)

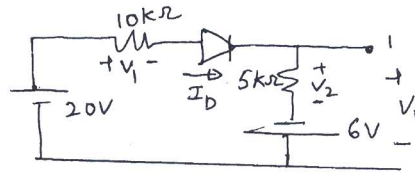


Fig. Q1 (b)

- c. For the clipping circuit shown in Fig. Q1 (c). Draw the transfer characteristics and output voltage waveforms. Assume silicon diodes. (08 Marks)

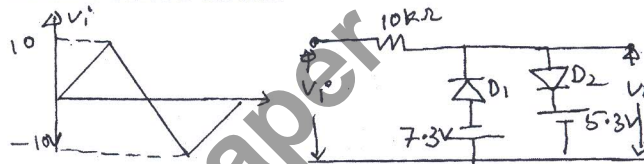


Fig. Q1 (c)

- 2 a. For an emitter bias circuit shown in Fig. Q2 (a). Find
i) Quiescent values of base and collector currents. ii) Quiescent values of V_{CE} .
iii) Voltage at base to ground and collector to ground. iv) Base to collector voltage.
Assume $V_{BE} = 0.7$ V, $\beta = 60$ (10 Marks)

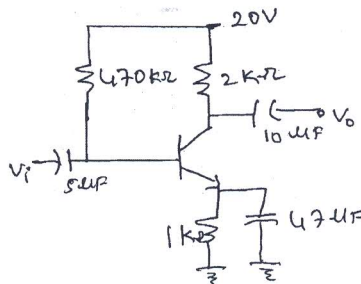


Fig. Q2 (a)

- b. For the voltage divider bias configuration. Derive expression for I_C and V_{CE} and expression for collector current when it is in saturation. Comment on stability factor. (10 Marks)
- 3 a. Describe how transistor behaves as switch. Also describe transistor switching time. (06 Marks)
b. For common base npn transistor configuration with $I_E = 4$ mA, $\alpha = 0.98$ and ac signal of 2 mV applied between base and emitter terminals. Determine:
i) Input impedance ii) The voltage gain of load 0.56 K Ω is connected to output terminals.
iii) Output impedance. iv) Current gain. (06 Marks)
c. Explain common emitter fixed bias configuration. Derive expression for the input impedance, output impedance, voltage gain and current gain. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

10ES32

- 4 a. Explain low frequency response of BJT amplifier. Derive the expression for lower cut-off frequency considering the effect of input coupling capacitor C_S . (10 Marks)
- b. For the circuit shown in Fig. Q4 (b). Calculate (i) f_{Hi} and f_{Ho} . (ii) f_β and f_T .
Take $C_{be} = 35$ P.F, $C_{bc} = 5$ P.F, $C_{ce} = 1$ PF, $C_{wi} = 6$ PF, $C_{wo} = 10$ P.F, $\beta = 100$ and $V_0 = \infty$. (10 Marks)

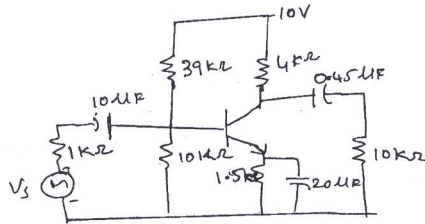


Fig. Q4 (b)

PART - B

- 5 a. Explain Darlington emitter follower. Draw the equivalent circuit. Derive expression for input impedance (Z_i), current gain (A_i), Voltage gain A_V and output impedance (Z_o). (10 Marks)
- b. Determine the voltage gain, input and output impedance with voltage series feedback having $A = -100$, $R_i = 10$ K Ω , $R_o = 20$ K Ω for feedback factor $\beta = -0.1$. (06 Marks)
- c. Discuss the advantages of negative feedback. (04 Marks)
- 6 a. Describe FET amplifier with voltage series feedback. Derive the expression for gain. (10 Marks)
- b. Explain the principles of class B amplifier operation. Derive expression for
(i) input dc power (ii) Output ac power (iii) η -efficiency
(iv) power dissipated by output transistor. (10 Marks)
- 7 a. Write the basic principle of oscillator. Also state the conditions for oscillation. (04 Marks)
- b. Describe any one type of tuned oscillator with relevant diagram. Write expression for frequency of oscillations. (08 Marks)
- c. RC phase shift oscillator $R_C = 5$ k Ω and $R = 3.3$ k Ω . Find the range of values of capacitor if it is required to vary frequency from 100 Hz to 20 kHz. (08 Marks)
- 8 a. Explain common gate JFET configuration with relevant circuit diagram. Draw equivalent circuit. Derive expression for Z_i , Z_o and A_V . (08 Marks)
- b. The self biased configuration of JFET has operating point defined by $V_{GSQ} = -2.6$ V and $I_{DQ} = 22.6$ mA and $I_{DSS} = 8$ mA and $V_p = -6$ V the value of $Y_{OS} = 20$ μ S as shown in Fig.Q8 (b). Find (i) g_m (ii) r_d (iii) Z_i (iv) Z_o (06 Marks)

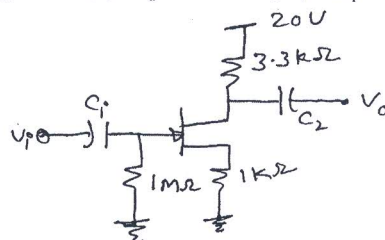


Fig. Q8 (b)

- c. Differentiate depletion type MOSFET and enhancement type MOSFET. (06 Marks)
