Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech

Branch	: CSE/ECE	**Semester**	: 3
Title of the Course	: Analog Electronics	**Course Code**	: ECB 206

Time: 3 Hours **Maximum Marks: 50**

Section A

Attempt all question **(10×1 = 10)**

1) Define common mode rejection ratio?
2) When a reverse gate voltage of JFET changes from 4 to 3.9V, the drain current changes from 1.3 to 1.6 mA. Find the value of trans conductance?
3) Determine the dc resistance levels for the diode of Fig. (a) at I_D= 2 mA

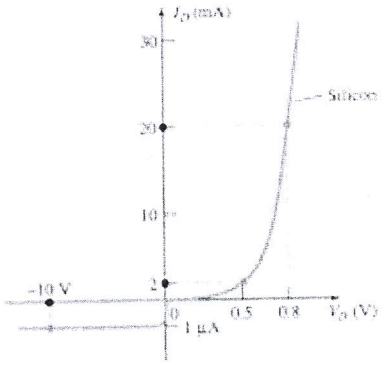


Fig. (a)

4) Draw I-V characteristics of diode?
5) Determine I_C, I_E for a transistor having I_B=15μA and β=150?
6) Which of the following is required for oscillation?
   (i) βA>1
   (ii) The phase shift around the feedback network must be 180°
   (iii) Both βA > 1 and the phase shift around the feedback network must be 180°.
   (iv) None of the above

P.T.O

7) Hartley oscillator is commonly used in .....?

(i) Radio receivers (ii) Radio transmitters (iii) TV receivers (iV) None of the above

8) When a silicon diode is forward biased, what is V_{BE} for a C-E configuration?

(i) Voltage divider bias (ii) 0.4 V (iii) 0.7V (iV) emitter voltage

9) Determine the output voltage for this circuit with a sinusoidal input of 2.5 mV?

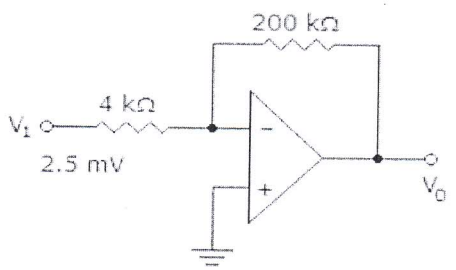


Fig. (b)

10) Define output offset voltage of op-amp?

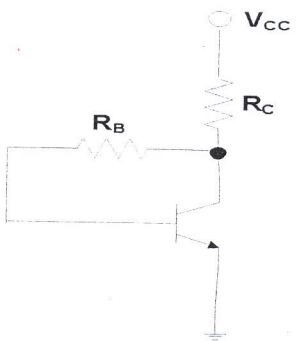
Section B

Attempt any four **(4×5 = 20)**

11) Discuss voltage divider bias with equations?

12) Write ideal characteristics of op-amp?

13) Calculate the quiescent current and voltage of a collector-to-bas bias arrangement using the following data V_{CC} = 10V, R_B=100kΩ, R_C=2KΩ, β=50, and also specify a value of R_B so that V_{CE} = 7V?



14) A crystal has the following parameters: L=0.5 H, C_S=0.06 pF, C_p=1pF and R=5KΩ. Find the series and parallel resonant frequencies and Q factor of the crystal?

15) Explain the working operation of JFET?

Section C

(2×10 = 20)

Attempt any two

16) What is barkhausen criterion? Discuss Hartley oscillator with diagram?

17) Discuss transistor as an amplifier? Explain the operation of common base configuration of BJT?

18) (i) In the circuit shown in Fig.(c) , if I_C=2mA ,V_{CE}=3V, β=100, V_{BE}=0.6V, R_2=10kΩ and R_4=500Ω, calculate R_1 and R_3?

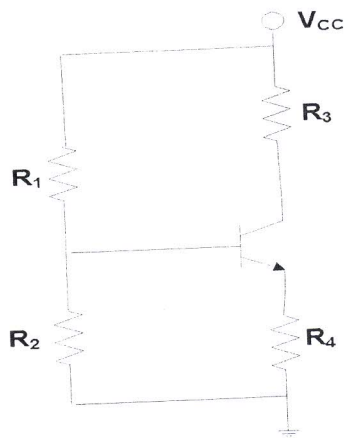


Fig.(c)

(ii) In an NPN transistor, β= 50 is used in common-emitter circuit with VCC=10V and RC=2KΩ. The bias is obtained by connecting the 100kΩ resistor from collector to base. Find the quiescent point?