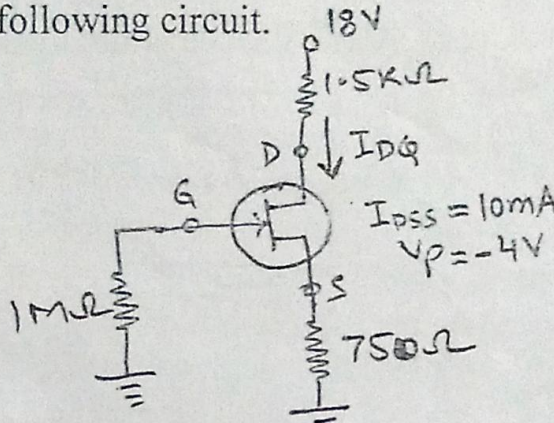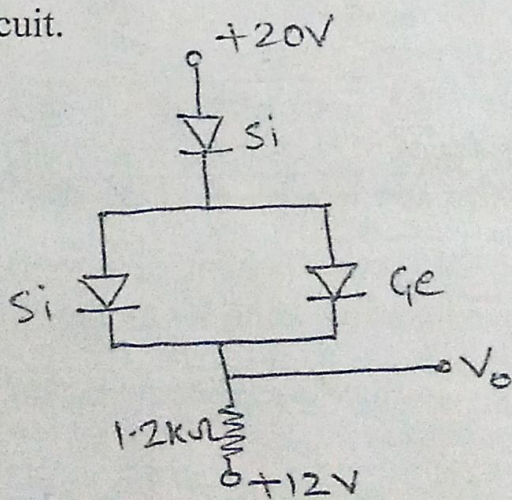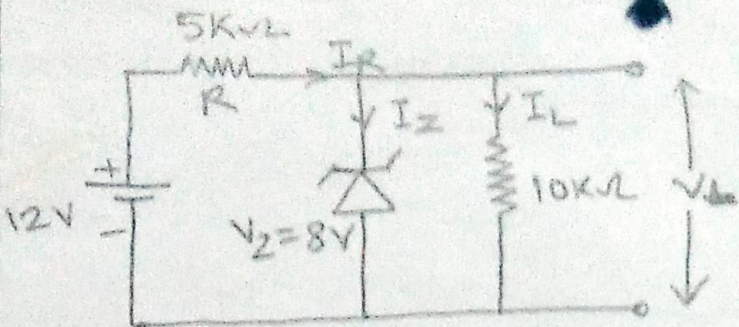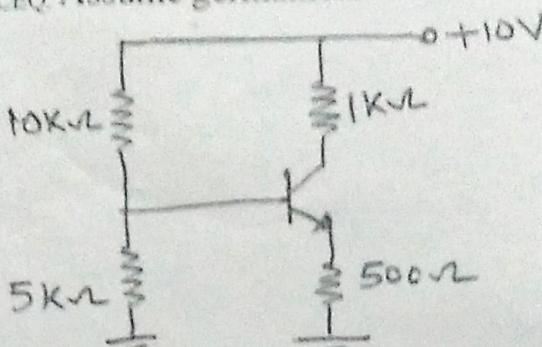## School of Engineering
Second Sessional Examination, Even Semester (AS: 2022-23)

B. Tech: CS-10, CS-19, AI-1(CSE), AI-2(CSE), AI-3(CSE), CCML-1(CSE), IOTBC-1(CSE)

Year: 1st	Semester: 2nd
Course Title: Basic Electronics Engineering	Max Marks: 60
Course Code: BEC3201	Time: 3*hrs*

Instructions: Read the question Carefully.

SECTION 'A'		Course Objective	Marks
Q.N.1. Attempt all parts of the following:			
a)	What is the PIV of the diode used in Half wave rectifier?	CO1	1
b)	Draw the characteristics of ideal diode.	CO1	1
c)	What do you mean by I_{CBO}?	CO1	1
d)	Why gate current is always zero in MOSFET?	CO2	1
e)	Implement X-OR gate with basic gate?	CO3	1
f)	Define amplitude modulation	CO3	1
g)	What do you mean by CMRR?	CO2	1
h)	Draw the circuit diagram of differentiator and Integrator.	CO2	1

SECTION 'B'		Course Objective	Marks
Q.N.2. Attempt any two parts of the following:			
a)	Explain working of full wave Bridge rectifier with input and output waveforms. In a centre tap full wave rectifier the rms half secondary voltage is 9 V. Assume load resistor (R_L) of 1 KΩ and diode forward resistor of 1Ω. Calculate I_{dc}, I_{rms}, ripple factor, P_{dc}, P_{ac} and rectification efficiency.	CO1	6
b)	Perform the following conversion. (i) $(64.625)_{10} = (?)_2$ (ii) $(47.32)_8 = (?)_{10}$ (iii) $(EF8C.D06)_{16} = (?)_2$ (iv) $(235.151)_8 = (?)_{16}$	CO3	6
c)	Derive the expression for the output of difference amplifier using OP-Amp. Find the output voltage of the following circuit		6

	R_f www $500K\Omega$ R_1 www $100K\Omega$ $2V = V_i$ V_o	CO2	
d)	Explain the working of n-channel JFET. Also define JFET parameters. Determine I_{DSQ} and V_{DSQ} for the following circuit. $18V$ $1.5K\Omega$ D I_{DQ} $I_{DSS} = 10mA$ $V_P = -4V$ G S $1M\Omega$ 750Ω	CO2	6

SECTION 'C'	Course Objective	Marks

Q.N.3. Attempt any two parts of the following:

a)	Explain the working of pn junction diode in reverse bias condition. Determine V_o for the following circuit. $+20V$ Si Si Ge V_o $1.2K\Omega$ $+12V$	CO1	5
b)	What do you mean by breakdown? Explain Zener breakdown mechanism. For the following circuit find V_L, I_L, I_Z, and I_R.		5

For the following voltage divider Circuit find I_{CQ} and V_{CEQ} Assume germanium transistor and $\beta = 100$.

		CO1	5
c)			

Q.N.4. Attempt any two parts of the following:

a)	With neat sketch explain the working of PNP transistor. Also derive the relationship between α and β.	CO2	5
b)	Explain the input and output characteristics of a BJT in CB configuration.	CO2	5
c)	Explain the construction and drain characteristics of N channel D-MOSFET.	CO2	5

Q.N.5. Attempt any two parts of the following:

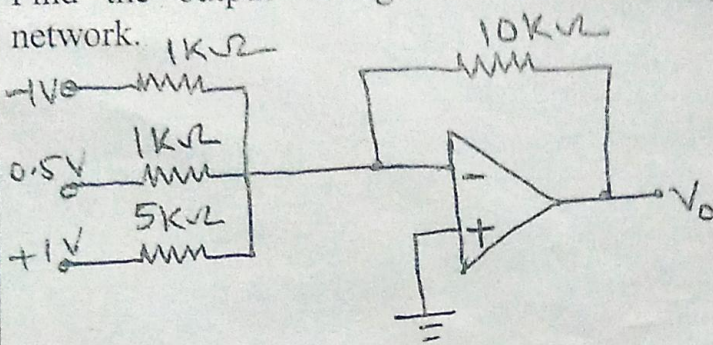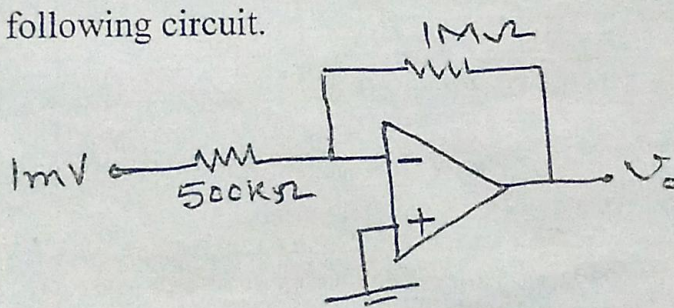|			
a)	Explain the block diagram of Communication system. What is the need for modulation?	CO3	5
b)	Perform the following subtraction using 1's and 2's complement $(24)_{10} - (17)_{10}$	CO3	5
c)	What are the universal gates? Reduce the following function using k map and implement the reduced function with NAND gate	CO3	5

$F(ABCD) = \Sigma(0,1,4,5,6,7,8,9,10,11,13,14)$	

Q.N.6. Attempt any two parts of the following:

a)	Derive the output expression for the inverting summing op amp. Find the output voltage for the following network. $1K\Omega$ $-1V$ $0.5V$ — $1K\Omega$ $5K\Omega$ $+1V$ $10K\Omega$ V_0	CO2	5
b)	Enlist the characteristics of ideal op-amp. Derive the expression of the output of the non-inverting op amp. Find the output V_0 of the following circuit. $1M\Omega$ $1mV$ — $500K\Omega$ V_0	CO3	5
c)	Which type of feedback is used for the oscillation? Explain the principle of oscillator and describe the Bark Hausen Criterion.	CO3	5

Table 1: Mapping between COs and questions
(Number of COs may vary from course to course)

COs	Questions Numbers	Total Marks
CO1	Q1(a,b,c)Q2(a)Q3(a,b,c)	24
CO2	Q1(d,g,h)Q2(c,d)Q4(a,b,c)Q6(a)	35
CO3	Q1(e,f) Q2(b)Q5(a,b,c)Q6(b,c)	33