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**BTECH**  
**(SEM II) THEORY EXAMINATION 2021-22**  
**EMERGING DOMAIN IN ELECTRONICS ENGINEERING**

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If you require any missing data, then choose suitably.

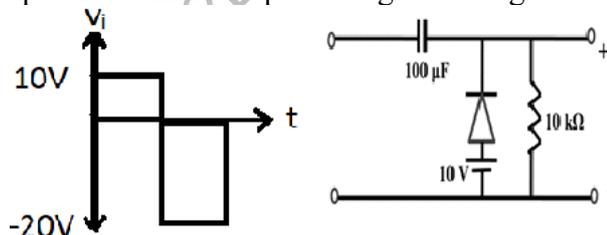
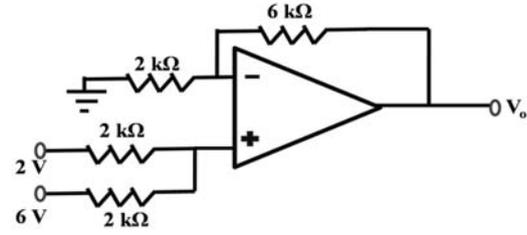
**SECTION A**

1. Attempt all questions in brief. 2\*10 = 20

Qno	Questions	CO
(a)	Discuss the formation of depletion layer in diode.	1
(b)	Explain the effect of temperature on diode.	1
(c)	What is difference between BJT and JFET.	2
(d)	Determine $\beta_{dc}$ and $I_{CBO}$ , If $I_E = 6mA$ , $I_C = 5.92mA$ and $I_{CEO} = 200mA$ .	2
(e)	What do you mean by CMRR in OP-AMP.	3
(f)	Which is better among microprocessor or microcontroller? Justify your answer with valid reason.	3
(g)	Determine base of the following: (i) $(345)_{10} = (531)_x$ (ii) $(2374)_{16} = (9076)_x$	4
(h)	Write the truth table of two input X-OR gate and two input X-NOR gate.	4
(i)	Calculate the transmission efficiency if the modulation factor is 0.5.	5
(j)	Enlist the merits of satellite communication.	5

**SECTION B**

2. Attempt any three of the following: 10\*3 = 30

Qno	Questions	CO
(a)	Define Clamper. Determine output voltage for the given network. 	1
(b)	Draw and explain common base N-P-N Transistor with its input and output characteristic graph. Also write an expression for output current.	2
(c)	Explain the concept of virtual ground in OP-AMP. Determine output Voltage for given network. 	3
(d)	Perform following operation as indicated. (i) Determine 2's complement of $(1010.110)_2$ . (ii) Convert $(25.125)_{10}$ into Hexadecimal number. (iii) Add binary number $(1011)_2$ and $(1111)_2$ . (iv) State De Morgan's Law. (v) Define minterm and maxterm.	4
(e)	Explain Amplitude modulation. Derive the expression for the total power radiated by the modulated signal. Also calculate modulation efficiency.	5

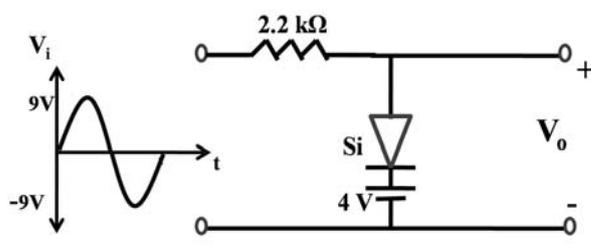
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**SECTION C**

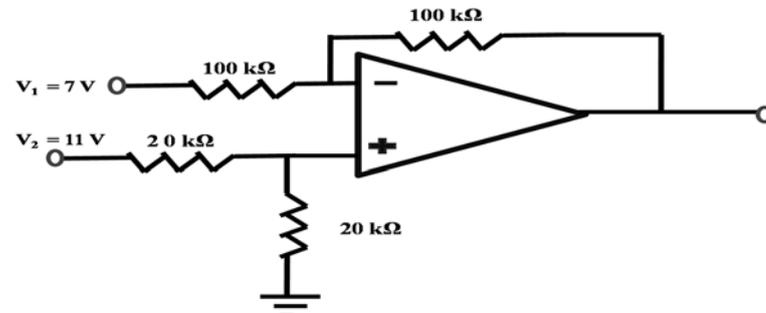
3. Attempt any *one* part of the following: 10\*1 = 10

Qno	Questions	CO
(a)	In the bridge rectifier circuit, the secondary voltage $V_s = 100 \sin 50t$ and load resistance is $1k\Omega$ . Calculate: (i) DC current (ii) RMS value of current (iii) Efficiency (iv) Ripple factor.	1
(b)	Determine and draw output voltage for given network.  	1

4. Attempt any *one* part of the following: 10 \* 1 = 10

Qno	Questions	CO
(a)	Explain the working of enhancement type MOSFET along with their transfer characteristics.	2
(b)	Describe the construction and working of P-Channel Depletion MOSFET, with characteristic graph. Also Justify that it is a voltage controlled device.	2

5. Attempt any *one* part of the following: 10\*1 = 10

Qno	Questions	CO
(a)	Briefly explain: (i) OP-Amp as Non-Inverting Amplifier. (ii) Inverting summer. (iii) Blue Tooth and Wi-Fi Technology.	3
(b)	Enlist the characteristics of ideal OP-Amp. Also determine the output voltage of following circuit.  	3



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6. Attempt any *one* part of the following: 10\*1 = 10

Qno	Questions	CO
(a)	Define universal logic Gates. Realize basic logic gates using NAND and NOR gates.	4
(b)	Simplify the function $F(A, B, C, D) = \sum m(0, 2, 5, 6, 7, 13, 14, 15) + d(8, 10)$ using K-map and implement the simplified function using NAND gates only.	4

7. Attempt any *one* part of the following: 10\*1 = 10

Qno	Questions	CO
(a)	Why do we need modulation? The antenna current of an AM transmitter is 8 A when only the carrier is sent, but it increases to 8.93 A, when the carrier is modulated by a single sine wave. Find percentage modulation. Determine the antenna current when the percent of modulation changes to 0.8.	5
(b)	An Audio frequency signal $10 \sin 6\pi \times 400t$ is used to amplitude modulate a carrier of $25 \sin 4\pi \times 10^5t$ . Calculate (i) Modulation Index (ii) Amplitude of each side band (iii) Total power delivered to the load of $2K\Omega$ (iv) Bandwidth (v) Transmission efficiency	5

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