PAPER ID-311338

Subject Code: BEC101

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM I) THEORY EXAMINATION 2023-24

FUNDAMENTALS OF ELECTRONICS ENGINEERING

TIME: 3HRS **M.MARKS: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

Q no.	Question	Marks	CO
a.	Explain the difference between the P-N junction diode and Light-Emitting diode.	2	1
b.	Why BJT is called a current controlled device?	2	2
c.	What is the basic difference between JFET and MOSFET?	2	2
d.	Add binary numbers $(1110.10 + 1011.11)_2$.	2	4
e.	Simplify the Boolean function $F = XY + XY'Z + YZ'$ using Boolean algebra.	2	4
f.	Explain the concept of virtual ground in OP-Amp.	2	3
g.	Write the two applications of Satellite communication.	2	5

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

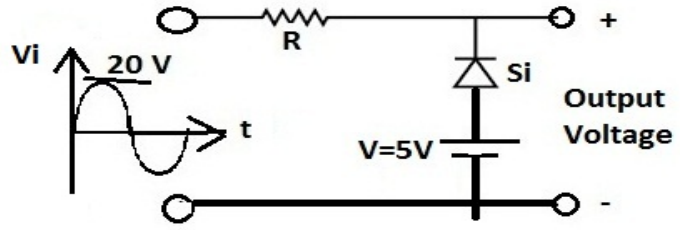
a.	Define the static and dynamic resistance of the Diode. Also differentiate between Transition and Diffusion capacitance.	7	1
b.	Draw and explain the working of the P-N-P Transistor in common-base (CB) configuration with its characteristic graphs.	7	2
c.	Define the common mode rejection ratio. Determine the output voltage of a differential amplifier for the input voltages of 300μV and 240μV. The differential gain is 5000 and the value of CMRR is 100.	7	3
d.	Perform the following as mentioned: (i) Convert $(63.250)_{10}$ to binary number. (ii) Convert $(10010.101)_2$ to decimal number. (iii) Convert $(A6B.0F)_{16}$ to octal number. (iv) Perform subtraction using 2′s complement $(111\text{-}1010)_2$. (v) Design AND, OR, and NOT gates using only NOR gates.	7	4
e.	Explain the need of modulation in the communication system.	7	5

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

a.	Draw and explain the construction and working of N-channel JFET with characteristic graphs.	7	2
b.	Draw and explain the construction and working of P-channel Depletion MOSFET with characteristic graphs.	7	2

4. Attempt any *one* part of the following: **7 x 1 = 7**

a.	Determine and draw the output voltage of given network. 	7	1

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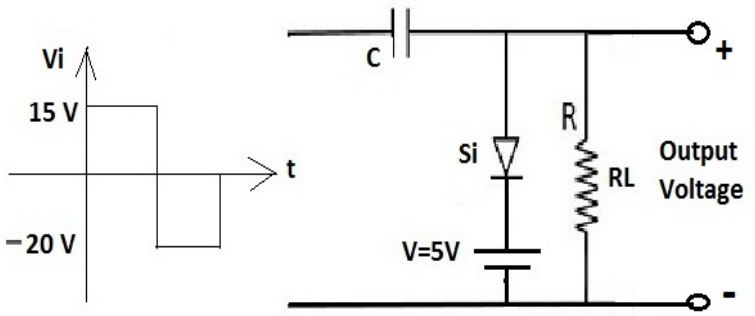
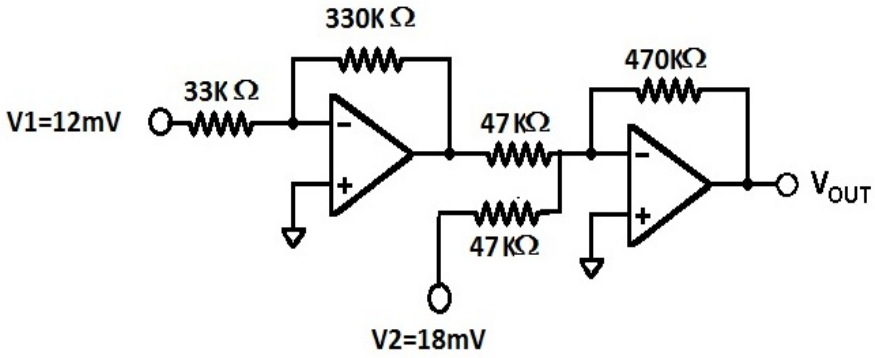
b.	Determine and draw the output voltage of given network. 	7	1

5. Attempt any *one* part of the following: 7 x 1 = 7

Q no.	Question	Marks	CO
a.	Draw the circuit diagram and explain the working of the Subtractor using OP-Amp. Also, derive the expression for the output voltage.	7	3
b.	Determine the output voltage of the given network. 	7	3

6. Attempt any *one* part of the following: 7 x 1 = 7

Q no.	Question	Marks	CO
a.	Simplify the function F= Σm(0,3,5,7,8,9,10,12,13)+Σd(1,6,11,14) using K-map and implement the simplified expression using NAND gates only.	7	4
b.	Simplify the function F= ΠM (0, 2, 10, 11, 12, 14, 15)•Πd (5,13)using K-map and implement the simplified expression using NOR gates only.	7	4

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

Q no.	Question	Marks	CO
a.	In an amplitude-modulated wave, derive the expression for (i) Amplitude of sidebands (ii) Sideband frequencies (iii) Modulation Index (iv) Modulation Efficiency	7	5
b.	Write short notes on (i) Amplitude Modulation technique (ii) Radar Communication	7	5