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BTECH
(SEM I) THEORY EXAMINATION 2023-24
BASIC ELECTRONICS

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**

a.	Determine the value of amplification factor β , if it is given that current amplification factor α is 0.98.
b.	Sate two reasons why modulation is needed in communication system.
c.	Draw the circuit of operational amplifier as unity follower circuit.
d.	Discuss the concept of virtual ground in an operational amplifier.
e.	Define amplification factor of a JFET.
f.	In a BJT, why the width of collector is kept maximum as compared to its base and emitter?
g.	State two differences between bipolar junction transistor and field effect transistor.

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

a.	Discuss the working of a bridge rectifier with help of neat circuit diagram.
b.	Explain the construction of a pnp transistor. With help of neat curves, discuss input and output characteristics of a bipolar junction transistor in common emitter configuration.
c.	What do you mean by amplitude modulation? A modulating signal $m(t)=30\cos(2\pi\times 10^3t)$ is amplitude modulated with a carrier signal $c(t)=80\cos(2\pi\times 10^5t)$. Calculate modulation index and amplitude of each side band.
d.	Draw the block diagram of an operational amplifier and write all the characteristics of an ideal operational amplifier.
e.	Discuss digital storage oscilloscope and compare it with an analog oscilloscope.

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

(a)	Discuss the construction and working of n channel enhancement type MOSFET. Also draw its transfer and drain characteristics.
(b)	With help of neat diagram, explain the working of operational amplifier as integrator and differentiator.

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

(a)	<p>Determine the output for the following circuit, if it is given that $V_1 = 2\text{ V}$ and $V_2 = 5\text{ V}$</p>
(b)	Calculate the output voltage for the given circuit, if $R_f = 420\text{K}\Omega$, $R_1 = 3.3\text{K}\Omega$, $R_2 = R_3 = 43\text{K}\Omega$ for an input voltage of 100 mV.



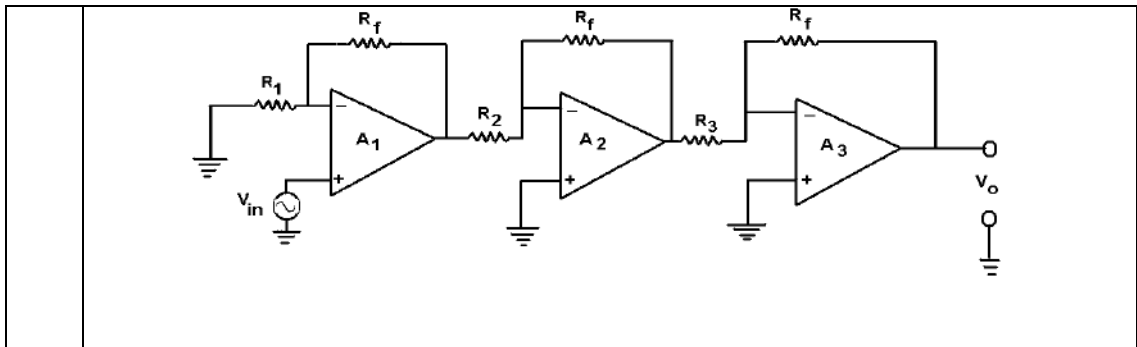
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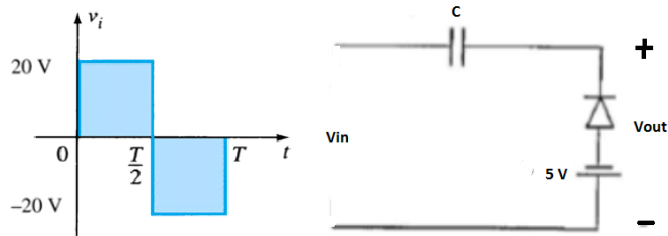
M.MARKS: 70



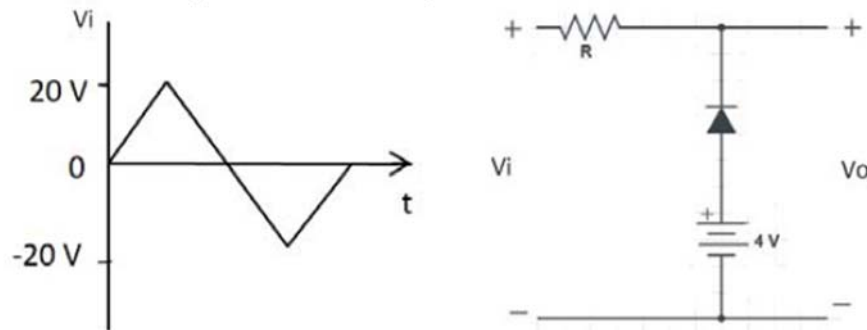
5. Attempt any one part of the following:

7 x 1 = 7

- (a) Determine output of the following circuit, if it is given that diode is made of germanium.



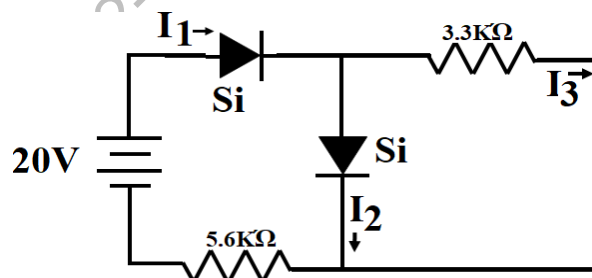
- (b) Determine the output for the following circuit:



6. Attempt any one part of the following:

7 x 1 = 7

- (a) Discuss the working of Zener diode as voltage regulator. Determine the currents I_1 , I_2 , I_3 and voltage across $5.6K\Omega$ resistor for the following network.



- (b) Write short notes on:
i) Light Emitting Diode



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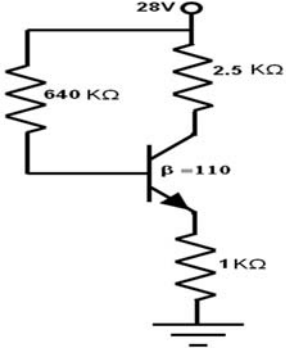
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	ii) Wi-Fi Technology
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7. Attempt any *one* part of the following:

7 x 1 = 7

(a)	<p>Calculate I_B, I_C and V_{CE} for the network shown below.</p> 
(b)	Describe the working of a cathode ray oscilloscope. Also draw its block diagram.

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