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**BTECH**  
**(SEM IV) THEORY EXAMINATION 2021-22**  
**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.

2x10 = 20

Qno	Questions	CO
(a)	Si is preferred as compared to Ge in semiconductor devices. Justify this statement.	1
(b)	Describe the term PIV.	1
(c)	Enlist the application of LED.	2
(d)	Describe the tunneling phenomenon.	2
(e)	Derive the relationship between $\alpha$ and $\beta$ for BJT.	3
(f)	Draw the transfer characteristics of JFET.	3
(g)	Describe the term CMRR and slew rate of an op-amp.	4
(h)	Enlist the characteristics of ideal op-amp.	4
(i)	Enlist the essential components of a CRT.	5
(j)	Explain the application of DSO.	5

**SECTION B**

2. Attempt any three of the following:

10x3 = 30

Qno	Questions	CO
(a)	Explain the working of PN junction diode with no-bias condition, forward bias condition and reverse bias condition. Also draw the V-I characteristics of PN junction diode.	1
(b)	Illustrate the working of half wave rectifier using circuit diagram also determine its different parameter.	2
(c)	Mention the different biasing techniques used in BJT. Explain any two of them.	3
(d)	Draw the block diagram and equivalent circuit of an op-amp. Also explain op-amp as inverting and non-inverting amplifier.	4
(e)	Illustrate the working of digital multimeter with their block diagram.	5

**SECTION C**

3. Attempt any one part of the following:

10x1 = 10

Qno	Questions	CO
(a)	Illustrate the diode resistance and diode capacitance.	1
(b)	Differentiate between Avalanche breakdown and Zener Breakdown mechanism.	1

4. Attempt any one part of the following:

10x1 = 10

Qno	Questions	CO
(a)	Determine the output voltage and output waveform for a given input waveform. Assuming Silicon diodes. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Input waveform: Square wave with <math>f = 1000 \text{ Hz}</math>. Amplitude: <math>10 \text{ V}</math> (positive) and <math>-20 \text{ V}</math> (negative). Time intervals <math>t_1, t_2, t_3, t_4</math> are marked.</p> </div> <div style="text-align: center;"> <p>Circuit diagram: An RC network with a capacitor <math>C = 1 \mu\text{F}</math> in series with a parallel combination of a diode (anode to input), a <math>5 \text{ V}</math> Zener diode (cathode to input), and a resistor <math>R = 100 \text{ k}\Omega</math>. The output voltage is <math>v_o</math>.</p> </div> </div>	2



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(b)	Explain the principle of operation and characteristics of an LED and Tunnel diode.	2
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**5. Attempt any one part of the following: 10x1 = 10**

Qno	Questions	CO
(a)	Draw the CE amplifier circuit and derive the expression for different characterizing parameters.	3
(b)	(i) Explain the construction and working of JFET. (ii) An enhancement type NMOS transistor with $V_t = 0.7$ V has its source terminal grounded and a 1.5 V applied to the gate. In what region does the device operate for a) $V_D = 0.5$ V                      b) $V_D = 0.9$ V                      c) $V_D = 3$ V.	3

**6. Attempt any one part of the following: 10x1 = 10**

Qno	Questions	CO
(a)	Draw the circuit diagram of an integrator and differentiator also find their output.	4
(b)	Illustrate the following op-amp parameters (i) input offset voltage (ii) output offset voltage (iii) input biased current (iv) input offset current (v) differential mode gain	4

**7. Attempt any one part of the following: 10x1 = 10**

Qno	Questions	CO
(a)	Describe measurement of voltage, current, frequency and phase using CRO.	5
(b)	Draw the block diagram of digital voltmeter. Also explain the ramp technique of digital multimeter.	5