Printed Pages:2 **Sub Code: REC 201**

Paper Id: 131287 **Roll No.**

B.Tech
(SEM II) THEORY EXAMINATION 2018-19
BASIC ELECTRONICS

Time: 3 Hours ***Total Marks: 70***

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

SECTION A

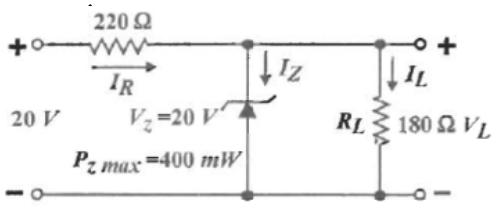
1. Attempt *all* questions in brief. **2 x 7 = 14**

a) What are Varactor (Varicap) Diodes? Describe their function
b) Why Si is preferred over Ge for manufacturing of electronic devices.
c) Define Op-Amp and Draw its block diagram.
d) Explain the Emitter-Follower Configuration.
e) Describe the working principle of a CRT.
f) Explain ohmic region and pinch off condition of the JFET.
g) Explain the need of modulation in communication.

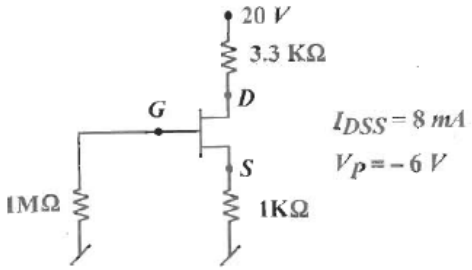
SECTION B

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

a) Differentiate between clipper and clamper circuits. Determine V_L, I_L, I_Z and I_R for the following circuit.



b) Explain the meaning and significance of the various currents and voltages V_{GS}, I_D, V_{DS}, V_D, V_G, V_S and determine the values of each for the following circuit.



c) Explain the difference between common mode and differential mode of op-amp. Determine the output voltage of an op-amp for input voltages of V_{i1} = 150 µV, V_{i2} =140 µV. The amplifier has a differential gain of A_d = 4000 and the value of CMRR is 100.
d) Explain the working principle of a Digital Storage Oscilloscope (DSO). Give a comparison of DSO with Analog Oscilloscope and state some advantages and applications of Digital Storage Oscilloscope.

e) Describe the various analog modulation techniques. For a frequency modulated wave having the equation, V = 5 sin (5000+2sin 1000t). Calculate the carrier frequency.

SECTION C

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

(a) Explain working and characteristics of Tunnel diode with the help of neat diagram. Explain how a Tunnel diode is different from a simple p-n junction diode.

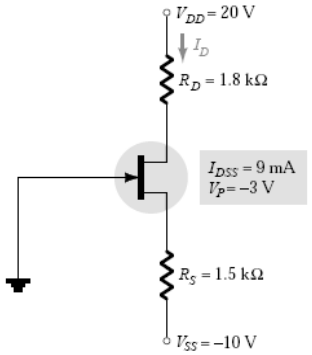
(b) Explain the structure, principle of operation and function of Liquid-Crystal Displays. State some advantages and applications of Liquid-Crystal Displays.

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

(a) Explain the working principle of enhanced type MOSFET. Also write advantage of MOSFET over JFET.

(b) For the *n*-channel depletion-type MOSFET of the following figure determine:

(i) I_{DQ} and V_{GSQ}.
(ii) V_{DS}.
(iii) V_D.
(iv) V_S.



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

(a) Derive an expression for integrator using op-amp. Draw output of integrator when input is sine-wave i.e. V_{in} = A sin ωt.

(b) Explain the various op-amp parameters: Input offset voltage, Output offset voltage, Input biased current, and Input offset current.

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

(a) Describe the Block Diagram and principle of operation of a simple Cathode Ray Oscilloscope. Explain how Measurement of voltage, current phase and frequency can be done using a CRO.

(b) Explain with the help of a neat diagram, working principle and characteristics curve of Ramp type digital voltmeter.

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

(a) Define Amplitude modulation. Derive the expression for AM modulated waveform. Define modulation index of AM.

(b) Describe the Electromagnetic spectrum and state some of the typical applications in the communication engineering field.