

**B. TECH.**  
**(SEM II) THEORY EXAMINATION 2018-19**  
**ELECTRONICS ENGINEERING**

Time: 3 Hours

Total Marks: 100

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

## SECTION A

1. Attempt all questions in brief. 2 x 10 = 20

- a. Define static and dynamic resistance of a diode.
- b. The reverse saturation current at room temperature of a Ge diode is  $5\mu\text{A}$ . Find the voltage applied across the junction to obtain a forward current of  $50\text{mA}$ .
- c. In a transistor  $I_B = 68\mu\text{A}$ ,  $I_E = 30\text{mA}$  and  $\beta = 440$ . Find the value of  $\alpha$  and  $I_C$ .
- d. A JFET has drain current of  $5\text{mA}$ . If  $I_{DSS} = 10\text{mA}$  and  $V_{GS(OFF)} = -6\text{V}$ . Find the value of  $V_{GS}$  and  $V_P$ .
- e. Enlist the ideal characteristics of opamp.
- f. Determine CMRR for an opamp for input voltage  $V_1 = 150\mu\text{V}$  and  $V_2 = 140\mu\text{V}$  and the output voltage is  $45.8\text{mV}$ .
- g. What are the applications of DMM?
- h. Why delay line is used in vertical deflection on CRO?
- i. Why demodulation is required in communication system?
- j. What are the sidebands in AM wave?

## SECTION B

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

- a. What is voltage multiplier? Draw and explain the circuit diagram voltage doublers. Draw the output waveforms with analysis for the given network as shown in fig (1)

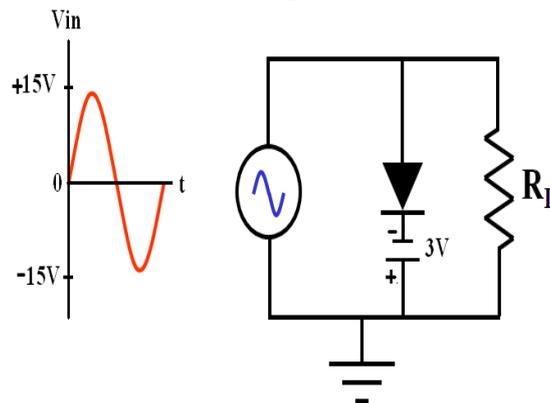


Fig (1)

- b. Draw the Common Base (CB) circuit of a junction transistor. Sketch and explain its input and output characteristics. Determine  $I_B$ ,  $I_C$  and  $V_{CE}$  for the network shown in fig (2)

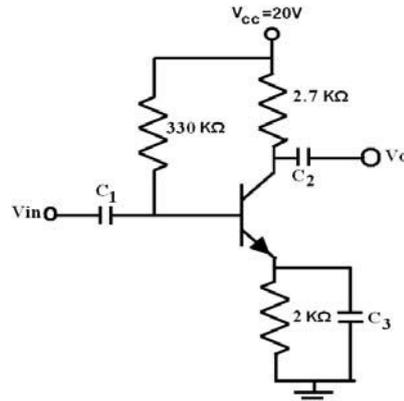


Fig (2)

- c. With suitable circuit diagram obtain the expression for output voltage for non-inverting OPAMP. Calculate  $V_o$  for the given network fig (3).

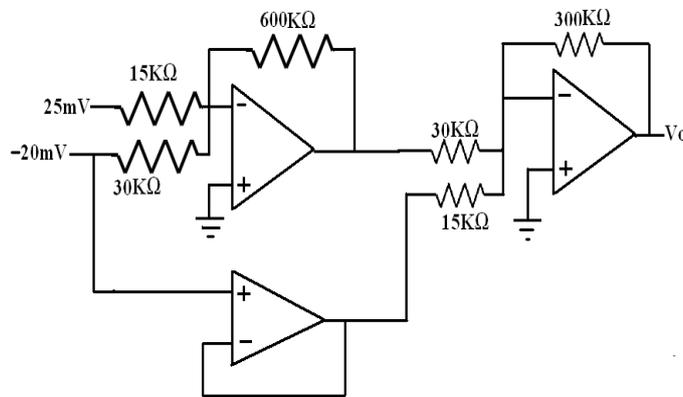


Fig (3)

- d. Draw the block diagram of CRO and explain the function of each block.  
 e. What is Angle modulation? Derive an expression for an FM wave with sinusoidal modulation. A 400 watt carrier modulated to a depth of 75 percent. Calculate the total power in the modulated wave.

**SECTION C**

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

- (a) Draw and explain the operation of centre tapped full wave rectifier with input output waveforms. Calculate DC current for the same.  
 (b) Draw the circuit for the given input and output as shown in fig (4)

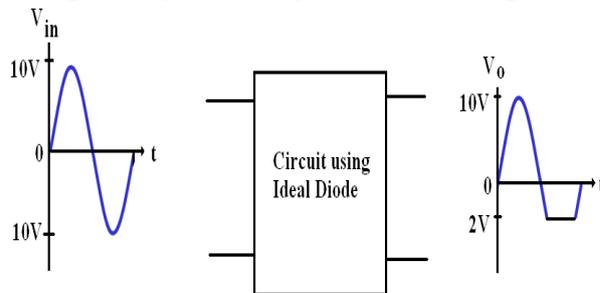


Fig (4)

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

- (a) Draw and explain construction and working principle of p-channel enhancement MOSFET with drain and transfer curve. How it is different from depletion type MOSFET?
- (b) Calculate  $Z_i$ ,  $Z_o$  and  $A_v$  for the network as shown in fig (5) given that  $r_d = 100K\Omega$  and  $g_m = 3mA/V$ .

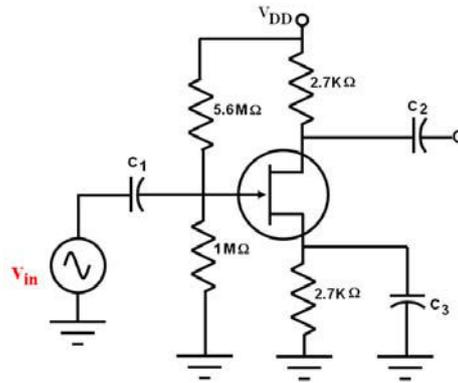


Fig (5)

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

- (a) With suitable circuit diagram obtain the expression for Non inverting, integrator and differentiator opamp.
- (b) Explain the concept of virtual ground. Find  $V_o$  for the network shown in fig

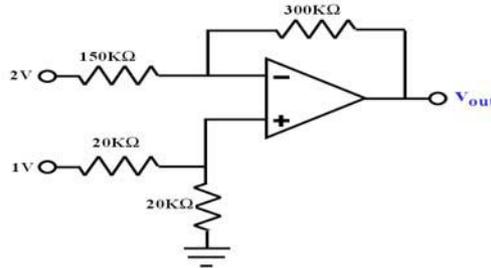


Fig (6)

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

- (a) Draw the block diagram of digital Multimeter and explain functions of each block.
- (b) Using suitable diagram explain the basic principle of ramp type Digital Voltmeter

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

- (a) Sketch the block diagram of communication systems and explain the function of each system.  
Show that the total power of a fully AM wave is 1.5 times of the unmodulated carrier wave.
- (b) In an FM system, when the audio frequency (AF) is 500Hz and the AF voltage is 2.4V, the deviation is 4.8 kHz. If the AF voltage is now increased to 7.2V, what is the new deviation? If the AF voltage is raised to 10V while the AF is dropped to 200Hz, what is the deviation? Also find the modulation index in each case.