

First/Second Semester B.E. Degree Examination, Dec.2019/Jan.2020  
**Basic Electronics**

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

**Module - 1**

- 1 a. Draw and explain zener voltage regulator with and without load. (06 Marks)  
b. With a neat circuit diagram and input output waveforms. Explain the working of a center tapped full wave rectifier and determine average load voltage. (08 Marks)  
c. What is a rectifier? Compare bridge rectifier with full wave rectifier. (06 Marks)
- 2 a. In a fullwave rectifier, the input is from 30-0-30V transformer the load and diode forward resistances are  $100\Omega$  and  $10\Omega$  respectively. Calculate the average voltage, rectification efficiency ( $\eta$ ) and percentage regulation. (07 Marks)  
b. Draw the CE circuit and sketch the output characteristics. Also indicate the different regions on the characteristics curve. (08 Marks)  
c. Draw the circuit diagram and explain the working of a half wave rectifier. (05 Marks)

**Module - 2**

- 3 a. Explain the operation of a voltage divider bias with suitable circuit diagram. (07 Marks)  
b. Mention 4 ideal characteristics of an opamp. (04 Marks)  
c. With a neat circuit diagram, explain opamp as an inverting amplifier. (05 Marks)  
d. Define the following: i) CMRR ii) Slewrate. (04 Marks)
- 4 a. Mention five applications of opamp. (05 Marks)  
b. Find the output of the op-amp circuit shown below (05 Marks)

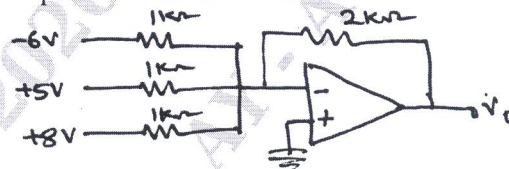


Fig.Q.4(b)

- c. Derive the application of opamp as a voltage follower. (05 Marks)
- d. Write the opamp symbol and label its parts. (05 Marks)

**Module - 3**

- 5 a. State Demorgan's theorem for 2 variables and prove it by perfect induction method. (06 Marks)  
b. Design an Halfadder using nand gates and also write its truth table. (06 Marks)  
c. Realize basic gates using nand gates. (06 Marks)  
d. Explain the construction of not gate using transistor and also write its truth table. (02 Marks)

- 6 a. Define 1's and 2's complement binary numbers with suitable example. (04 Marks)  
 b. Perform the binary addition of +29 and +19. (04 Marks)  
 c. Perform the following conversion:  
 i)  $(ABFE)_{16} = ( )_2 = ( )_{10}$   
 ii)  $(10AB)_{16} = ( )_{10}$  (06 Marks)  
 d. Perform subtraction using 2's complement method:  
 i)  $28 - 19$   
 ii) Multiply  $11 \times 13$  in binary number system. (06 Marks)

**Module - 4**

- 7 a. Explain the working of NAND gate RSFF with suitable logic diagram. (05 Marks)  
 b. Explain the pinout and signal of 8051 microcontroller. (08 Marks)  
 c. What thermister? Mention 5 passive electric transducers. (07 Marks)
- 8 a. Explain the architecture of 8085 microprocessor with suitable block diagram. (08 Marks)  
 b. Explain see beck effect and peltier effect with suitable example. (04 Marks)  
 c. Mention any 4 active electric transducers. (04 Marks)  
 d. Explain piezo electric transducers. (04 Marks)

**Module - 5**

- 9 a. Analyze the amplitude modulation and get an equation by derivation as sum of LSB and USB in addition to carrier as modulated signal ie.  

$$e(t) = E_c \sin w_c t + \frac{1}{2} m E_c \sin(w_c + w_m)t - \frac{1}{2} m E_c \sin(w_c - w_m)t$$
 (08 Marks)  
 b. Compare the characteristics between amplitude modulation and frequency modulation. (04 Marks)  
 c. Explain the block diagram of optical fibre communication. (08 Marks)
- 10 a. Explain elements of common system with the help of a block diagram. (07 Marks)  
 b. What is demodulation (of AM)? Explain. (05 Marks)  
 c. Explain the block diagram of cellular mobile. (05 Marks)  
 d. What are the 3 types of ISDN channels? (03 Marks)

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