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**002301**

**Mar. 2022**

**B.Tech. III SEMESTER  
Basic Electronics(ESC-201)**

Time : 90 Minutes]

[Max. Marks : 25

*Instructions :*

- 1. It is compulsory to answer all the questions (1 mark each) of Part-A in short.*
- 2. Answer any three questions from Part-B in detail.*
- 3. Different sub-parts of a question are to be attempted adjacent to each other.*

**PART-A**

1. (a) What is CMRR and PSRR in op-amps? (1)  
(b) How can zener diodes be used as voltage regulators. (1)  
(c) What is Barkhausen's criteria for sustained oscillations? (1)  
(d) A half wave rectified sinusoidal waveform has a peak voltage of 10 V. What is average value & rms value of the fundamental components ? (1)

- (e) In a BJT,  $I_{co} = I_{cbo} = 2\mu A$ . Given  $\alpha = 0.99$ . What is the value of  $I_{cco} = ?$  (1)
- (f) A Differential amplifier has a differential gain of 20,000. CMRR = 80 dB. What is common mode gain? (1)
- (g) A Wein Bridge oscillator has  $R_1 = R_2 = 220 \text{ K Ohm}$  and  $C_1 = C_2 = 250 \text{ pF}$ . What will be frequency of oscillations ? (1)
- (h) The sum  $S$  of  $A$  and  $B$  in a Half adder can be implemented by using  $K$  NAND gates. What is value of  $K$  ? (1)
- (i) What do you understand by the term analog communication? (1)
- (j) The output of a particular op-amp increases  $8 \text{ V}$  in  $12 \text{ micro sec}$ . What is slew rate? (1)

### PART-B

2. (a) Discuss the working of op-amps as inverting summer and integrator and derive equations for the same. (3)
- (b) Derive the expression for frequency of oscillation of Wein Bridge Oscillator. (2)
3. (a) Draw the circuit diagram of half wave rectifier and explain its working. Also determine (i) average dc output current (ii) rms output current (iii) ripple factor (iv) rectification efficiency (v) PIV. (3)

- (b) What are universal gates? How can NOR gate be used to realize all the other logic gates. (2)

4. What are flip-flops? Discuss the SR flip-flops with their truth tables. How are SR flip-flops different from JK-Flip-flops? (5)
5. (a) Explain the input and output characteristics of Bipolar junction transistor. (3)
- (b) Implement the following function using 4 to 1 multiplexer :
- $$Y(A, B) = \Sigma(0, 2, 3)$$
- (2)
6. (a) What is need of modulation? Compare AM and FM modulation. (3)
- (b) Explain the block diagram of GSM system. (2)