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Total Number of Pages : 2

B.TECH

2<sup>nd</sup> Semester Regular Examination-April-May 2019**BBSES1041 – Basic of Electronics****(Regulations 2018) Common to AEIE,BT,CHEM,CIVIL,ECE,EE,EEE, IT Branches**

Time : 3 Hours

Maximum : 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

**PART – A: (Multiple Choice Questions) 10 x 2=20 Mark****Q.1. Answer ALL Questions.**

- a. Rest mass energy of electron is – [CO1] [PO1]  
 a).1.02 MeV b). 0.511 KeV c) 0.511 MeV d) 2.02 MeV
- b. Which of the following material has highest barrier potential, used for p-n junction diode? [CO1] [PO1]  
 a) Ge b) Si c) GaAs d) None of the above
- c. In a half wave rectifier the open circuit voltage from the secondary of the transformer [CO3] [PO2]  
 $V_s = V_m \sin \phi t$ , then the peak value of load current will be (R<sub>f</sub> is dynamic resistance of diode and R<sub>s</sub> is resistance of transformer secondary)  
 a)  $V_m / RL + R_s$  b)  $V_m / RL + R_s + R_f$  c)  $V_m / RL + R_s - R_f$  d)  $V_m / RL - R_s - R_f$
- d) In a BJT the collector current in common emitter configuration is [CO4] [PO2]  
 a)  $\alpha IE + ICBO$ , b)  $\alpha IE + ICEO$ , c)  $\beta IB + ICBO$ , d)  $\beta IB + ICEO$
- e) Cathode Ray Oscilloscope displays graph of waveforms based on- [CO3] [PO1]  
 a)Current b) Resistance c)Potential Difference d)Temperature
- f) In amplitude modulation, bandwidth is \_\_\_\_\_ the audio signal frequency [CO1] [PO1]  
 a) Thrice b) Four times c) Twice d) None of the above
- g) The superhetrodyne principle provides selectivity at \_\_\_\_\_ stage [CO1] [PO1]  
 a) RF b) IF c) Audio d) Before RF
- h) How many gates would be required to implement the following Boolean expression before [CO4] [PO2]  
 simplification?  $XY + X(X+Z) + Y(X+Z)$   
 a) 1 b) 2 c) 4, d) 5 [CO3] [PO1]
- i) How many possible outputs would a decoder have with a 5-bit binary input? [CO3] [PO1]  
 a) 16 b) 32 c) 64 d) 128
- j) One application of a digital multiplexer is to facilitate:  
 a)Data generation b) Serial- to –parallel conversion c) Parity checking d) Data selector

**PART – B: (Short Answer Questions) 10x2=20 Marks****Q.2. Answer ALL questions**

- (a) If the temperature of a Silicon diode increases from 293K to 383K, than what happens [CO1] [PO1]  
 to the forward characteristic of the device?
- (b) Define Transition capacitance and diffusion capacitance. [CO1] [PO1]
- (c) In a CE transistor, the base current is 0.01mA and emitter current is 1mA. Calculate [CO4] [PO1]  
 the values of  $\alpha$  and  $\beta$ .
- (d) What happens when peak amplitude of the signal is greater than DC biasing voltage of [CO3] [PO1]  
 transistor?
- (e) Draw the transfer characteristic of JFET. [CO1] [PO1]
- (f) What do you mean by frequency spectrum? Calculate the frequency and time period of [CO4] [PO2]  
 the following sinusoidal signal:  $f(t) = 5\sin(300t)$ .
- (g) Why a time base voltage is generally given to the horizontal plate of CRO? [CO3] [PO2]
- (h) A wave form occupies six divisions of an Oscilloscope screen when the time base is [CO4] [PO2]  
 switched off. The voltage gain is set to 0.25 V/div. Calculate the rms current being  
 tested if the resistance of the circuit is known to be 19 Ohm.
- (i) Covert  $(10.01)_{10}$  to its equivalent binary number. [CO4] [PO1]
- (j) Name the various logic states in an S-R flip-flop. [CO1] [PO2]

**PART – C: (Long Answer Questions) 4x15 =60 Marks****Answer ALL questions**

- Q.3**
- a. Define a p-n junction diode. Explain the working of diode also draw the V-I characteristic. [5] [CO1] [PO1]
- b. A full wave center tap type rectifier uses two crystal diodes each having forward resistance of 25 Ohm. The rms value of secondary voltage fed between center taps to each end of secondary is 48 V and  $R_1$  is 1000 Ohm. Find [10] [CO4] [PO2]  
 i)  $I_m$ ,  $I_{dc}$  and  $I_{rms}$  ii) DC output voltage iii) Efficiency iv) PIV
- OR**
- c. How a Zener diode is used in a voltage regulator? [5] [CO1] [PO2]
- d. A Germanium diode carries a current of 10 mA when forward bias of 0.2 volt applied. [CO4] [PO1]  
 (A) Estimate the reverse saturation current  $I_s$ .  
 (B) Calculate the voltage needed for the diode currents of 1mA and 100 mA. [10]  
 Comment on the range of these voltages.  
 If the above data applies at room temperature, Estimate  $I_s$  at 20 degree above this temperature and also the value of diode current at 0.2 V forward bias.
- Q.4**
- a. Define active, saturation and cutoff region of a transistor? Draw the input and output characteristics of CB and CE transistor amplifier and write the comparison. [5] [CO1] [PO1]
- b. How many types of FET are there? With neat sketch describe the working of Depletion type and Enhancement type MOSFET. [10] [CO1] [PO1]
- OR**
- c. Why biasing circuits are required for a transistor? Draw the circuit diagram of voltage divider biased method and derive all the related mathematical equations. [10] [CO1] [PO1]
- d. In a bias circuit with emitter stabilized resistor,  $R_B = 560\text{ K}\Omega$ ,  $R_C = 4.7\text{ K}\Omega$ ,  $R_E = 1\text{ K}\Omega$ ,  $V_{CC} = 10\text{V}$ ,  $\beta = 80$ , coupling capacitors of  $0.01\text{ }\mu\text{F}$  and  $C_E = 0.047\text{ }\mu\text{F}$  are used, Draw the circuit diagram and find the values of  $V_{CEQ}$  and  $I_{CQ}$ . [5] [CO4] [PO2]
- Q.5**
- a. (i) State and explain the function of sweep generator in an Oscilloscope. [5] [CO3] [PO1]
- b. What is a Lissajous pattern? Explain how phase measurement can be done using an Oscilloscope through Lissajous method. [10] [CO3] [PO2]
- OR**
- c. Draw the block diagram and explain the principle of a Function generator. [5] [CO3] [PO1]
- d. Describe briefly the working of AM transmitter and receiver with suitable diagram. [10] [CO1] [PO1]
- Q.6**
- a. (i) Derive an expression for sum and carry output of a Full adder circuit, Also implement the Full adder using two half adder and an OR gate. [7] [CO4] [PO1]
- b. Simplify the following Boolean function using Boolean algebra identities: [CO4] [PO1]  
 $F(A,B,C,D) = \sum_m(0,1,3,4,7,9,11,15)$  and then realize the simplified functions using logic gates. [8]
- OR**
- c. What is MUX? Design the following Boolean function using MUX, [8] [CO3] [PO2]  
 $F = A'B'C' + ABC + AB'C + A'B'C'$
- d. What is a flip-flop? Show the logic implementation of R-S flip-flop. [7] [CO3] [PO1]