

Registration No:

Total Number of Pages: 03

**B.TECH**  
**15BE2101**

**1<sup>st</sup> Semester Regular Examination 2015-16**

**BASIC ELECTRONICS**

**BRANCH: ALL**

**Time: 3 Hours**

**Max Marks: 100**

**Q.CODE: T845**

**Answer Part-A which is compulsory and any four from Part-B.**

**The figures in the right hand margin indicate marks.**

**Part – A (Answer all the questions)**

**Q1** Answer the following questions: *multiple type or dash fill up type* **(2 x 10)**

- a) When current amplification factor ( $\alpha$ ) is 0.98, the factor would be equivalent to which value of transistor amplification factor  $\beta$ .  
(i) 49 (ii) 60 (iii) 20 (iv) 38
- b) An ideal op-amp operation amplifier has  
(i) Infinite output impedance. (ii) Zero input impedance.  
(iii) Infinite bandwidth. (iv) All of the above.
- c) Convert the decimal number 151.75 to binary  
(i) 10000111.11 (ii) 11010011.01  
(iii) 00111100.00 (iv) 10010111.11
- d) In a half wave rectification if the input frequency is 50 Hz, then the output has frequency \_\_\_\_\_.  
(i) 12.5 Hz (ii) 25 Hz (iii) 100 Hz (iv) 50 Hz
- e) A BJT is said to be operated in saturation region if  
(i) both the junction  $J_E$  and  $J_C$  are reverse biased.  
(ii) both the junction  $J_E$  and  $J_C$  are forward biased.  
(iii)  $J_E$  is forward biased  
(iv) all are correct.
- f) If a square wave is fed to a integrating circuit then the output will be \_\_\_\_\_.  
(i) sine wave (ii) Rectangular wave (iii) Triangular wave (iv) Square wave.
- g) The piezoelectric effect in a crystal is \_\_\_\_\_.  
(i) a voltage developed because of mechanical stress.  
(ii) change in resistance because of temperature.  
(iii) change of frequency because of temperature.  
(iv) none
- h)  $A + A'B =$  \_\_\_\_\_.  
(i) A (ii)  $A + B$  (iii)  $A' + B'$  (iv) B
- i) A transistor converts  
(i) DC power in to ac power. (ii) AC power in to dc power  
(iii) High resistance in to low resistance. (iv) Low resistance in to high resistance
- j) A clamping circuit adds which component to the signal  
(i) Dc (ii) AC (iii) both ac & dc (iv) None

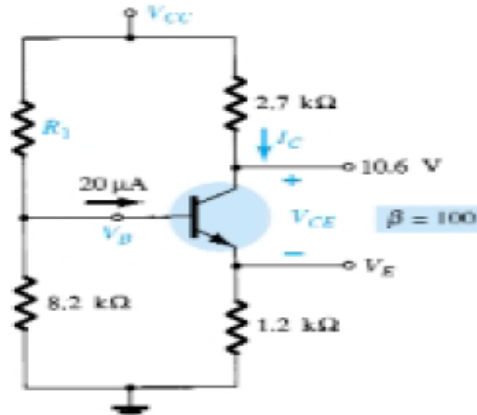
**Q2** Answer the following questions: *Short answer type* **(2 x 10)**

- a) State De-Morgan's theorem.
- b) Write difference between combinational and sequential circuit.
- c) What is a Barkhausen criteria?
- d) Write advantages of -ve feedback amplifier.

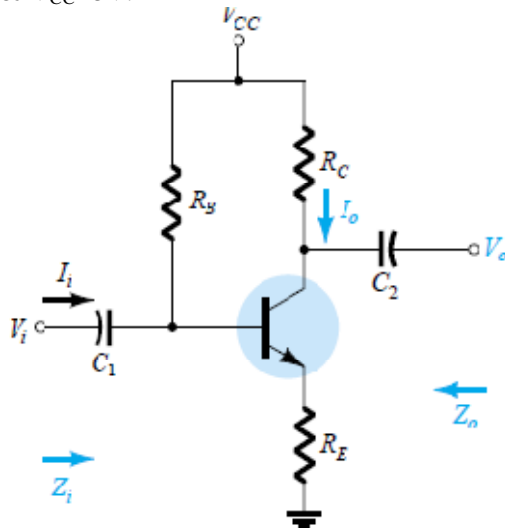
- e) Design OR gate using NAND gate only.
- f) The leakage current in Ge is  $5\mu\text{A}$  in  $10^\circ\text{C}$ . find its value when temperature is  $25^\circ\text{C}$ .
- g) Draw a voltage follower circuit using OP-AMP.
- h) Draw the input characteristics of common base (CB) configuration
- i) Find the value of radix R for which  $(52)_R + (16)_R = (70)_R$
- j) Define the term  $h_{fe}$ ,  $h_{ie}$ ,  $h_{oe}$  and  $h_{re}$  of a transistor.

**Part – B (Answer any four questions)**

- Q3** a) Define biasing. why biasing is required? (3)
- b) Convert the given expression in to canonical POS form (4)  
 $Y = (A+B)(B+C)(A+C)$
- c) Calculate  $I_C$ ,  $V_E$ ,  $V_{CC}$ ,  $V_{CE}$ ,  $V_B$  &  $R_1$  (8)

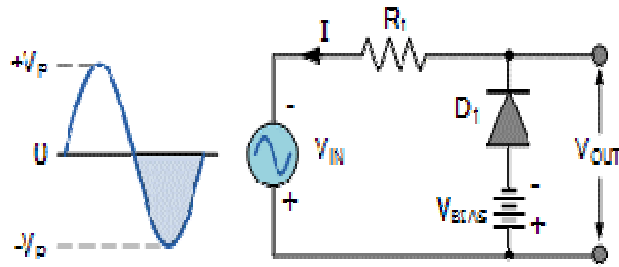


- Q4** a) A negative feedback of  $\beta = 2.5 \times 10^{-3}$  is applied to an amplifier of open loop gain 1000. Calculate the change in overall gain of the feedback amplifier if the open loop gain of the amplifier reduces by 20%. (7)
- b) Draw the approximate hybrid equivalent model of given circuit and determine  $Z_i$ ,  $Z_o$ ,  $A_v$  and  $A_i$ . Given  $h_{fe} = 120$ ,  $h_{ie} = 1.175 \text{ k}\Omega$ ,  $h_{oe} = 20 \mu\text{A/V}$ ,  $R_B = 330 \text{ k}\Omega$ ,  $R_C = 2.7 \text{ k}\Omega$  &  $V_{CC} = 8 \text{ V}$ . (8)

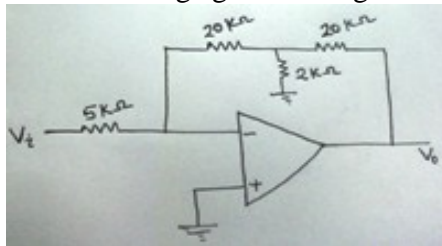


- Q5** a) Derive an expression for  $I_{dc}$  and  $I_{rms}$  of center tap full wave rectifier circuit & find its maximum efficiency. (8)

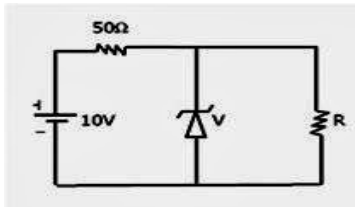
- b) Determine the expression of  $V_{out}$  for the following network and draw its output wave form, assume Si diode. (Given  $V_p=16V$  &  $V_{BIAS}=4V$ ) (5)



- c) Distinguish intrinsic and extrinsic semiconductor. (2)
- Q6 a) Define CMRR and slew rate. (2)
- b) An OP-AMP has a slew rate of  $1 V/\mu sec$  with a gain of 40 decibel. If this amplifier has to faithfully amplify sinusoidal signal from 0 to 20 KHz without any distortion what must be the maximum input signal level. (8)
- c) Explain the principle of crystal oscillator. (5)
- Q7 a) Write principle and working of CRO with proper block diagram (10)
- b) Prove that  $ABC+ABC'+AB'C+A'BC=AB+AC+BC$  (5)
- Q8 a) Define virtual ground concept. (3)
- b) Find the voltage gain of the given op-amp (7)



- c) The 6v zener diode shown in fig below has zero zener resistance and a knee current of 5 mA passing through it. Find the minimum value of R so that voltage across it does not fall below 6 V. (5)



- Q9 Write short notes (any three): (5X3)
- a) Full adder
- b) R-S Flip-Flop
- c) clamper circuit with example.
- d) R-C phase shift oscillator.