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Total Number of Pages: 03

B.TECH
15BE2101

2nd Semester Regular Examination 2015-16
BASICS OF ELECTRONICS

BRANCH: ALL

Time: 3 Hours

Max Marks: 100

Q.CODE: W459

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)**

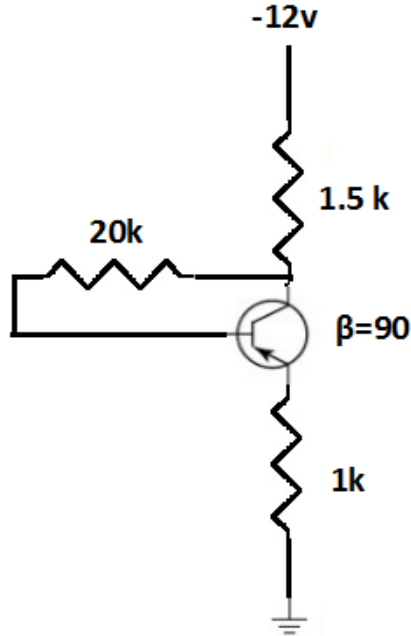
- Frequency spectrum of a time discrete signal is _____ in nature.
- The r. m. s. value of $x(t) = 10\sin 50\pi t$ is _____.
- OPAMP employs _____ feedback topology.
- Common Base BJT circuit is also called _____ buffer.
- _____ is known as data selector.
- Clamper provides _____ distortion.
- LED uses which type of semiconductor?
- If $(23)_r + (46)_r = (102)_r$, then value of $r =$ _____.
- Ripple factor of full wave rectifier circuit is _____.
- Current sampling is also known as _____ sampling.

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

- State De-Morgan's Theorem.
- How current series feedback affects the impedance of an amplifier?
- What is the principle of duality? Hence, apply it to the Boolean expression $x+x'=1$.
- The current amplification factor of emitter follower circuit is 90. What is its value for common base circuit?
- State Barkhausen principle of oscillation.
- Differentiate between SRAM and DRAM.
- What is biasing? Why is it required?
- Draw the VTC curve of a digital inverter. Hence determine NM_H and NM_L from it.
- Draw the equivalent circuit of a Zener diode.
- Write truth table of a three input EX-OR gate.

Part – B (Answer any four questions)

Q3 a) Determine operating point of the transistor shown in Fig-1. **(7)**



(Fig.-1)

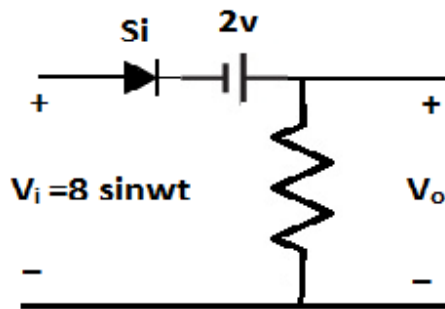
b) Which type of biasing network provides excellent biasing. Design such a circuit with the following data. **(8)**

Q-pt (6V , 2mA), Collector supply = 12V , $V_C = 8\text{V}$, $\beta = 90$

Q4 a) Realize OPAMA as adder, subtractor, buffer, integrator and differentiator circuit. **(10)**

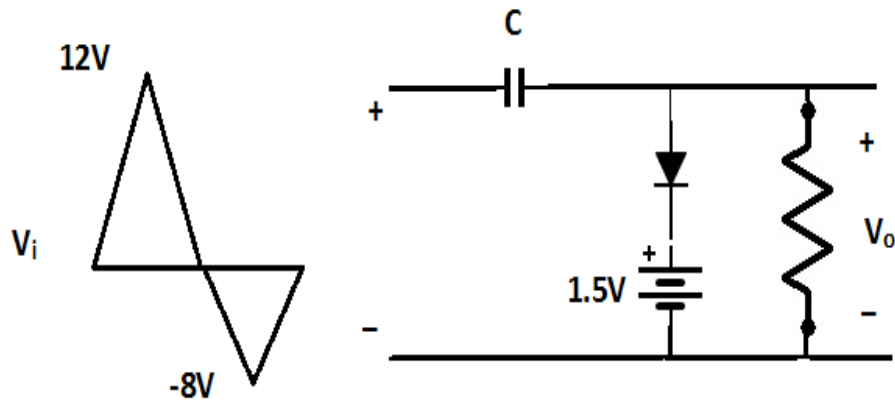
b) Compare among CB, CE and CC configurations with respect to A_v , A_i , Z_i and Z_o **(5)**

Q5 a) Draw output waveform V_o with respect to input waveform V_i for the circuit shown in Fig.2 **(6)**



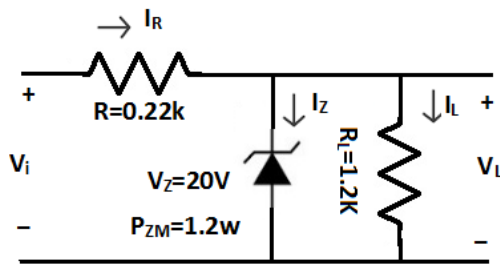
(Fig.-2)

- b) Find V_0 for the circuit shown in Fig.3 (6)



(Fig.-3)

- c) Draw the energy band diagram of a p-type semiconductor. (3)
- Q6 a) Determine the range of values of V_i that will maintain the Zener diode in the on state for the circuit shown in Fig.4. (5)



(Fig.-4)

- b) Derive I_{dc} , I_{rms} , ripple factor, PIV, rectifier efficiency of a center tapped full wave rectifier. (10)
- Q7 a) What are the binary arithmetic circuits? Realize one of them using a multiplexer. (5)
- b) Convert the Boolean function $Y = A B' + BC + A'C'$ in to canonical forms. (6)
- c) Perform the subtraction $(1101)_2 - (0101)_2$ using 2's complement method. (4)
- Q8 a) Derive frequency of operation of R-C phase shift oscillator using BJT. (10)
- b) State the Advantages of negative feedback. How it affects the bandwidth of an amplifier. (5)
- Q9 Write short note on any Three: (5X3)
- CRO
 - Extrinsic semiconductor
 - Voltage regulator
 - Full subtractor