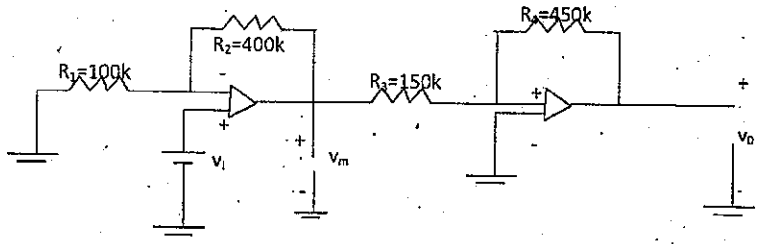
(ii) For the circuit, as shown in the following, determine the output voltage v_o if the input voltage v_i = 1.2 V.



5 Attempt any two : **10×2**

(a) (i) Write down characteristics of ideal OP-AMP.

(ii) What is close loop non inverting amplifier, derive expression for it.

(b) (i) Convert the following numbers:

(i) $(4021.25)_{10} = (\ )_2$

(ii) $(101010.10)_4 = (\ )_8$

(iii) $(23.AB)_{16} = (\ )_2$

(iv) $(111011)_2 = (\ )_{\text{gray code}}$

(v) $(23.53)_{10} + (23.53)_8 = (\ )_{10}$

(ii) Minimize the following Boolean function and draw its logic diagram using minimum universal gates.

$$(\bar{A}+B)(A+B+C)\bar{D}$$

(c) Explain the construction and working of n- channel enhancement type MOSFET. Also draw its drain and transfer characteristics of the same.

PAPER ID : 3033

TEC-201 **Printed Pages : 4**

Paper ID and Roll No. to be filled in your Answer Book

Roll No.

B. Tech.

(SEM. II) (EVEN SEM.) EXAMINATION, 2013

FUNDAMENTAL OF ELECTRONICS ENGINEERING

Time : **3** Hours] [Total Marks : **100**

Note : Attempt all questions, the marks assigned to each question is indicated at question itself.

1 Attempt any four : **5×4**

(a) Define Semiconductor materials on the basis of energy band diagram with example.

(b) How electron hole pairs are generated. Explain working of different forms of semiconductors.

(c) Why Si is preferred over Ge for manufacturing of electronics devices. How Semiconductor diode behaves as a switch.

(d) Explain the effect of temperature on I-V characteristics of p-n junction diode.

(e) Differentiate between extrinsic and intrinsic semiconductor on the basis of impurity present in them.

(f) Explain working of Semiconductor diode at different biasing conditions, no bias, forward bias & reverse bias condition.

2 Attempt any four : **5×4**

(a) Explain full wave bridge rectifier.

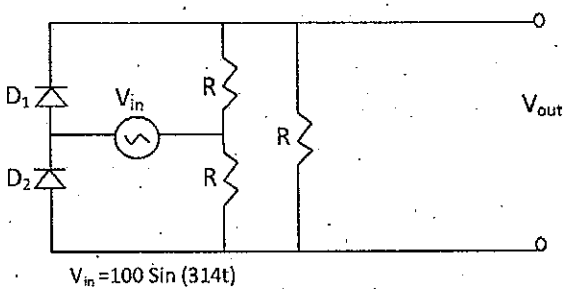
(b) Prove that efficiency of full wave rectifier is 81 %.

(c) The reverse saturation current of a Silicon diode is 3 nA AT 27 °C. find -

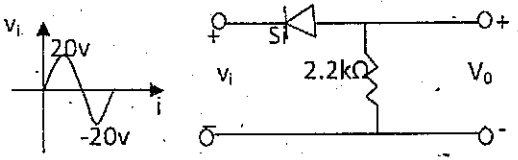
(i) Reverse saturation current at 82 °C.

(ii) Forward current at 82 °C if forward voltage applied is 82 °C.

(d) Sketch V_0 for the circuit shown below. D_1 and D_2 are silicon diodes.



(e) Determine v_0 for network given below.

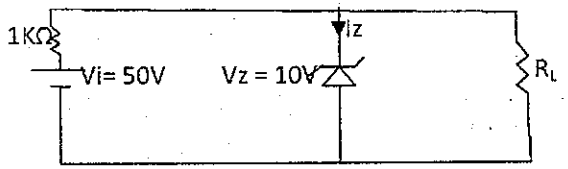


(f) Explain Voltage Doubler or Voltage Tripler with neat diagram.

3 Attempt any two : **10×2**

(a) (i) Explain Zener diode, draw its symbol and V-I characteristics.

(ii) In a Zener Voltage Regulator find the range of R_L and I_L for load voltage to be constant.



(b) Design a Voltage Regulator that will maintain an output voltage of 20V across a 1KΩ load with an input that will vary between 30 and 50 V. That is, determine the proper value of series Resistance (Rs) and maximum current I_{ZM}.

(c) Explain Zener Diode applications as shunt regulator.

4 Attempt any two : **10×2**

(a) (i) Derive relation in between α & ß of transistor, also calculate ß for given α=0.95.

(ii) Explain potential divider biasing of transistor.

(b) (i) Explain working of npn transistor at no bias and active mode condition.

(ii) What is close loop non inverting amplifier, derive expression for it.

(c) (i) The BJT amplifier has $h_{fe} = 100$, $V_{BE} = 0.007V$, $I_{CO} = 0$. Calculate the value of R_1 and R_C. Such that $I_C = 1mA$ and $V_{CE} = 2.5V$.