

Name of the Examinations: **B.E. CHEMICAL ENGINEERING SECOND YEAR FIRST SEMESTER SUPPLEMENTARY EXAM – 2018**

Subject : **ELEMENTARY ELECTRONICS** Time: 3 hours

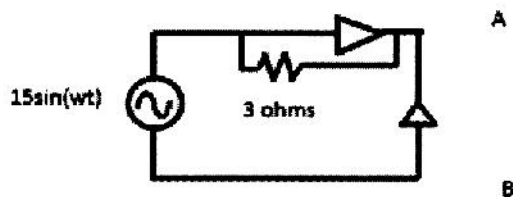
Ful Marks:100

Instructions: Answer question 1 and 4 other questions. (5X20=100). **Write to the point and handwriting should be clean and clear else marks will be deducted.**

1. For each of the statements below indicate whether the statement is true or false. 20X1=20

- i) Electrons are Bosons.
- ii) Positive clipper clips the negative polarity of the input voltage.
- iii) The base of transistor is heavily doped.
- iv) BJT is unipolar device.
- v) Transistor is current controlled current device.
- vi) There is no forbidden state in SR flip flop.
- vii) R and S denote reset and set in RS flip flop.
- viii) If the base current of CE BJT,  $I_B=20\text{mA}$ ,  $\beta=100$  then collector current  $I_C=1.95\text{ A}$ .
- ix) Flip-flop is an example of sequential logic circuit.
- x)  $A(B+\overline{B})=A$ .
- xi) In reverse bias condition current does not flow through zener diode until zener breakdown voltage is reached.
- xii) Two diodes are required in half wave rectifier.
- xiii) Avalanche diode has negative temperature coefficient.
- xiv) Current direction is same as the direction of flow of the hole.
- xv) Drift current flows due to movement of carriers under electric field.
- xvi) Built in potential opposes flow of majority carriers across depletion region.
- xvii) Current density of any carrier=conductivity X Electric field X area
- xviii) At forward bias voltage across depletion region of diode decreases from built in potential.
- xix) Any diode can be used for voltage regulation.
- xx) Biasing is done to set the Q point.

2. i) Find the current curve across AB . Mark the different current amplitudes in the curve. The diodes are normal diodes with forward biased voltage drop=0 volt.



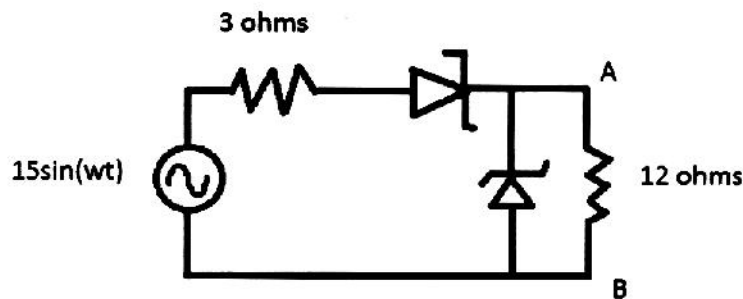
[ Turn over

ii) A semiconductor bar has intrinsic carrier concentration  $1.5 \times 10^{10}$  /cc. After doping its electron concentration is  $10^{15}$ /cc and electron concentration is  $10^4$ /cc. Find the built in potential. 3

iii) Explain clamper with circuit diagram and voltage curves. 5

iv) Find voltage curve across AB. Mark the different voltage amplitudes. The forward voltage drop across zener diodes are 0 and zener voltages are 0.5 volt.

3.5+3.5



3. i) What is rectifier? What is the ripple factor for bridge full wave rectifier?

2+1

ii) Calculate the following for half wave rectifier:

a) DC output current

b) RMS output current

c) Ripple Factor

d) Efficiency

3x4

iii) Draw and explain how bridge rectifier converts ac voltage to pulsating dc.

5

4. i) What do you mean by the "T" in BJT? Why it is called so? Draw the circuit for common emitter BJT. 1+2+2

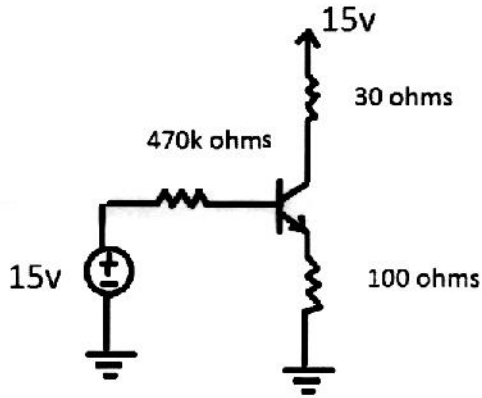
ii) Compare band structures and conductivity properties of insulator, conductor and semiconductor.

iii) What is q point? Why biasing is done? Draw any 2 biasing circuits for common emitter transistors.

1+3+2

iv) Find  $I_E$  for the circuit below. Consider  $V_{BE}=0.7$  volts.  $\beta=100$ .

4

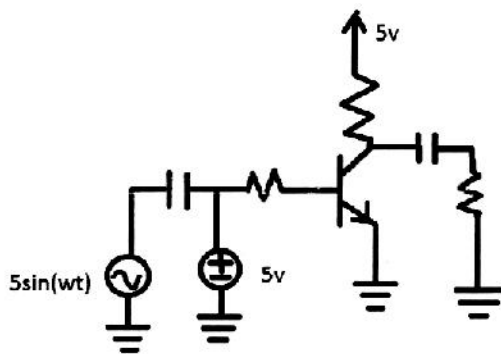


5. i) Draw output characteristics and transfer characteristics curve for Common emitter BJT. 2+2

ii) Explain how clipper work? 4

iii) Explain pinch off in JFET. 4

iv) What is the purpose of bypass and coupling capacitor? Draw the small signal high frequency equivalent circuit of the following BJT circuit. 2+2+ 4



6. i) Convert decimal to binary:  $(256)_{10}=(?)_2$ ,  $(0.125)_{10}=(?)_2$

2+2

ii) Simplify the expression of Y using k map.

$$Y=f(A,B,C,D)=\sum(m_2,m_3,m_4,m_5,m_6,m_{12},m_{13})$$

5

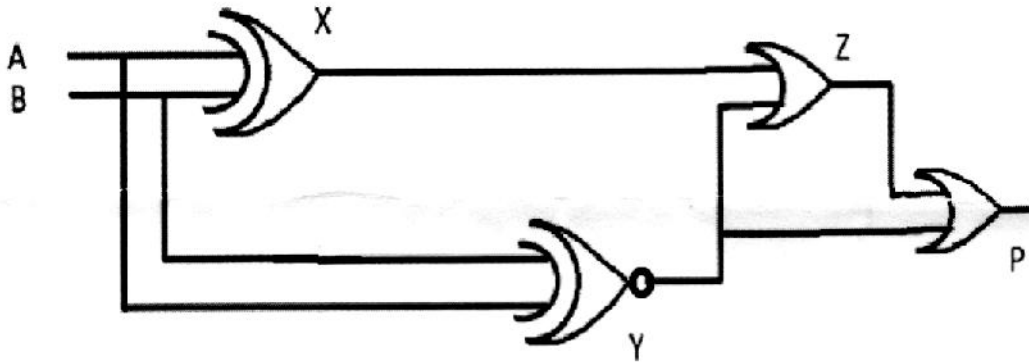
iii) Write the expression for Z [f(A,B,C)] in canonical SOP form.

$$Z=(A+B)C$$

4

iv) Write the simplified expressions of X,Y,Z and P in terms of A and B.

4



v) Simplify the expression:  $X= AC(A+ \overline{A})+(AB+AB)+AB+ABC\overline{C}+(B+A)(AB+ \overline{A})$

3

7. i) Draw T flip-flop.

4

ii) Draw the a) truth table, b) present state-next state table, c) excitation table, d) k map and

e) Characteristic equation for this flip-flop.

3+3+3+3+3

iii) Why JK flip flop is better than RS flip flop?

1