

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

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

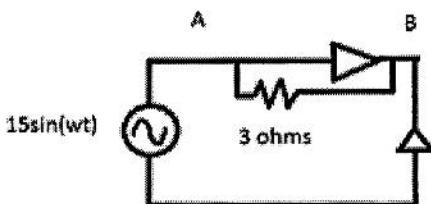
Ful Marks:100

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) Protons are Bosons.
- ii) Positive clamper clips the negative polarity of the input voltage.
- iii) P channel JFET has Gate heavily doped with electrons.
- iv) JFET is unipolar device.
- v) Transistor is current controlled voltage device.
- vi) There is no forbidden state in T flip flop.
- vii) R and S denote rest and set in RS flip flop.
- viii) If the base current of CE BJT,  $I_B=20\text{mA}$ ,  $\beta=100$  then collector current  $I_C=1\text{ A}$ .
- ix) Counter is an example of sequential logic circuit.
- x)  $A(1+\overline{B})=A$ .
- Xi) In forward bias condition current does not flow through zener diode until zener breakdown voltage is reached.
- Xii) 4 diodes are required in half wave rectifier.
- Xiii) Zener diode has negative temperature coefficient.
- Xiv) Current direction is same as the direction of flow of the hole as well as electron.
- Xv) Drift current flows due to movement of charges under electric field.
- Xvi) Built in potential opposes flow of minority carriers across depletion region.
- Xvii) Current density of any carrier=conductivity X Electric field
- Xviii) At forward bias voltage across depletion region of diode increases from built in potential.
- Xix) Zener 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.

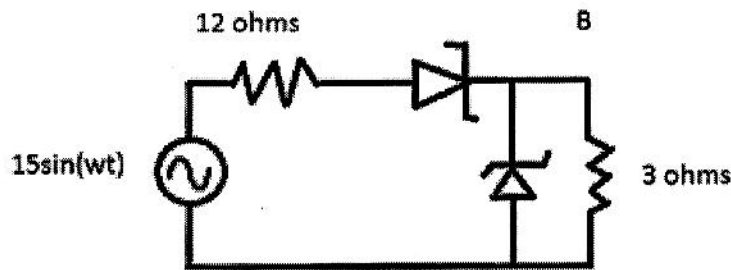


ii) A semiconductor bar has intrinsic carrier concentration  $1.5 \times 10^{10}$  /cc. After doping its electron concentration is  $10^{15}$  /cc. Find its electron concentration. 3

iii) Explain positive 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 centre tapped full wave rectifier?

2+1

ii) Calculate the following for bridge wave rectifier:

a) DC output current

b) RMS output current

c) Ripple Factor

d) Efficiency

3x4

iii) Draw and explain how half wave rectifier converts ac voltage to pulsating dc. 5

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

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

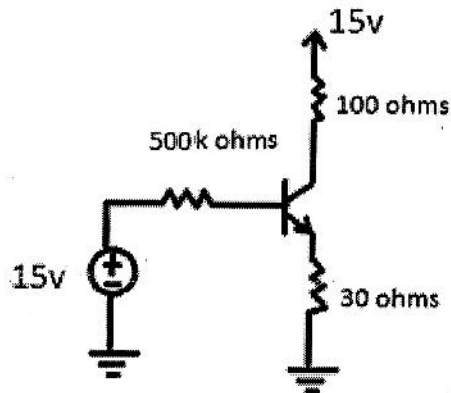
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iii) What is q point? Why biasing is done? Draw voltage divider biasing circuits for common emitter transistors.

1+3+2

iv) Find  $I_E$  for the circuit below. Consider  $V_{BE}=0.7$  volts.  $\beta=50$ .

4



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

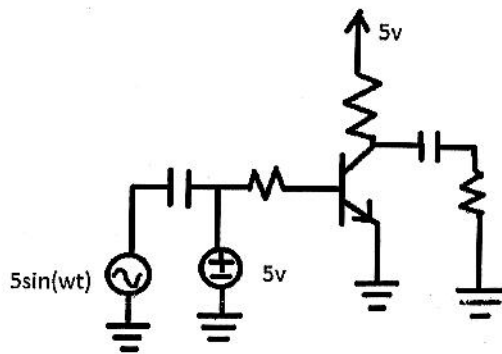
ii) Explain how clipper work? 4

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:  $(252)_{10}=(?)_2$ ,  $(0.125)_{10}=(?)_2$

2+2

ii) Simplify the expression of Y using k map.

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

5

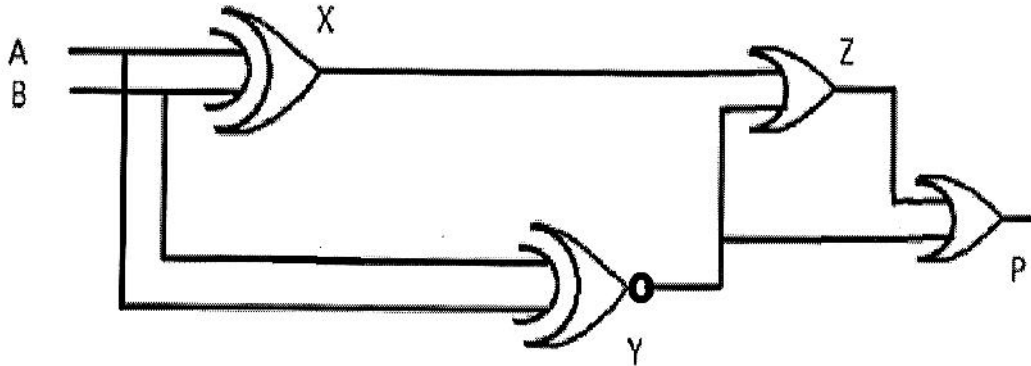
iii) Write the expression for Z  $[f(A,B,C)]$  in canonical SOP form.

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

4

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

4



v) Simplify the expression:  $X = AC(A + \overline{A})(AB + AB + 1) + AB + ABC + (B + A)(AB + A)$

3

7. i) Draw D 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