Seat No._____

GANPAT UNIVERSITY
B. TECH. SEMESTER III (EC) ELECTRONICS & COMMUNICATION ENGINEERING
CBCS REGULAR EXAMINATION, NOV / DEC-2014
(2EC 302) ELECTONICS DEVICES AND CIRCUITS

TIME: 3 HOURS   TOTAL MARKS: 70

INSTRUCTION:-
1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

1 (A) Explain the criteria for selecting a suitable operating point and factors affecting the stability.   6

   (B) For the circuit shown in figure, find I_C, V_{CE}, S.   6
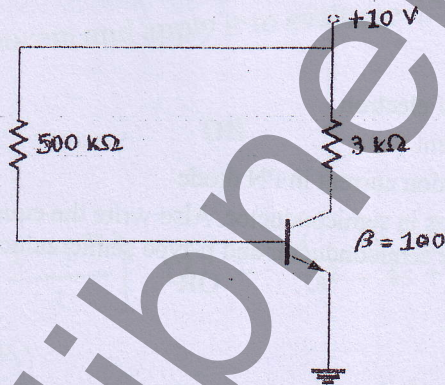
OR

1 (A) Draw the circuit diagram of CB configuration. Draw input and output characteristics with different regions.   5

   (B) Calculate the values of A_i, A_v, Z_i, Z_o for the CE amplifier circuit shown in figure for given Resistive load of 1 KΩ.   7

$h_{ie} = 2.7\ kΩ$
$h_{fe} = 220$
$h_{re} = 1.5 \times 10^{-4}$
$h_{oe} = 18\ \mu\mho$
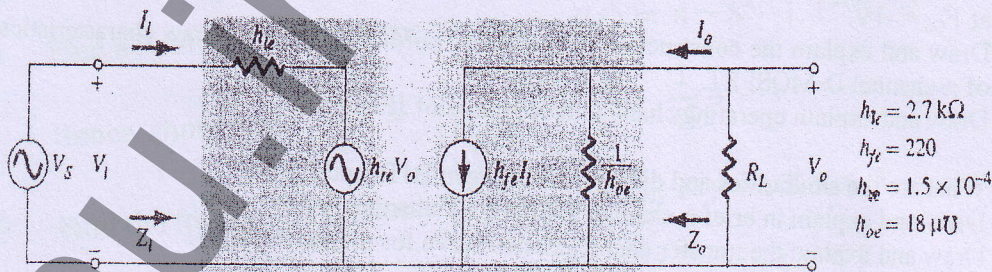
2 (A) Explain the Emitter bias circuit. Derive the expression for collector current I_C and collector emitter voltage V_{CE}. Also draw dc load line for emitter bias circuit.   6

   (B) Define h-parameter of a transistor. Draw the low frequency hybrid equivalent Circuit for CE & CB amplifier   5

OR

2 (A) Write short notes on :   6
       (i) Photo transistors   (ii) Darlington amplifiers

(B) A cascaded amplifier consists of three stages. The voltage gains of the stages: $A_{v1}=10$, $A_{v2}=15$, $A_{v3}=20$. What is the overall voltage gain? Also express each gain in Decibels (dB) and determine the total voltage gain in dB. **5**

3 (A) Answers the following questions : **8**
    (i) Why transistor is called current controlled device?
    (ii) Why collector is made larger than emitter and base?
    (iii) Why CE configuration is most popular in amplifier circuits?
    (iv) Can a transistor be obtained by connecting two semiconductors diodes back-to-back?

(B) Derive the relation between α and β with respect to BJT **4**

SECTION-II

4 (A) Define following term: **6**
    (i) Mass action law
    (ii) Drift velocity of electron
    (iii) Diffusion current
    (iv) Reverse saturation current in PN diode

(B) Explain charge densities in semiconductor. Also write the equation of minority carrier concentration in n-type semiconductor and p-type semiconductor. **6**

OR

4 (A) Define following term: **6**
    (i) Forbidden Gap
    (ii) Mean free path of electron
    (iii) Mean life time of carrier
    (iv) Diffusion capacitance in PN diode (C_D)

(B) Give a brief note on reverse recovery time for P-N junction diode. **6**

5 (A) For an n-channel JFET with resistance $r_o = 10k\Omega$, $V_{GS}= 0V$, $V_P= -6V$. Find resistance r_d at $V_{GS} = -1V$. **2**

(B) Draw and explain the construction of n-channel D-MOSFET. Also Draw characteristics of n-channel D-MOSFET. **3**

(C) Draw and explain operating characteristics curve of JFET. **6**

OR

5 (A) What are the similarities and differences between BJTs and FETs? **3**

(B) Draw and explain in brief n-channel E-MOSFET characteristics. **3**

(C) Draw and explain the transfer characteristics curve for n-channel JFET. **5**

6 (A) Explain in brief Photolithography process and Ion implantation for IC fabrication. **3**

(B) Explain Class B power amplifier. **4**

(C) Explain following diode in brief. **5**
    (i) Photo Diode
    (ii) Tunnel Diode

END OF PAPER