BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – Dip.ME-2019/Dip.ME-2021
Course Name – Fundamental of Electronics
Course Code - DME401
(Semester IV)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i) The input offset current equals & result can be produced as

   a) difference between two base currents   b) average of two base currents
   c) collector current divided by current gain   d) None of these

(ii) A common-mode signal is applied to the prediction on

   a) the non-inverting input   b) the inverting input
   c) both inputs(inverting & non-inverting)   d) None of these

(iii) Identify the condition for a transistor to act as an amplifier.

   a) The emitter-base junction is forward   b)
   biased, and the base-collector junction is   No bias voltage is required
   reverse biased
   c) Both junctions are forward biased   d) Both junctions are reverse biased

(iv) What is rectification?

   a) Process of conversion of ac into dc   b) Process of conversion of low ac into high ac
   c) Process of conversion of dc into ac   d) Process of conversion of low dc into high dc

(v) With a PNP circuit, the most positive voltage is shown probably:

   a) ground   b) VC
   c) VBE   d) VCC

(vi) In a BJT, if the collector-base junction is reverse-biased and the base-emitter junction is forward-biased, which region is the BJT operating in?

   a) Saturation region   b) Active region
   c) Cutoff region   d) Reverse active region

(vii) What is the use of the compensation capacitor in op-amp?

   a) Improves the amplification of op-amp   b) Decreases the slew rate of op-amp
   c) Increases the bandwidth of op-amp   d) Op-amp acts as all pass filter

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(viii) Barrier potential in a PN junction as the cause indicates

    a) Flow of drift current

    b) Diffusion of majority carriers across the junction

    c) Migration of minority carriers across the junction

    d) Thermally generated electrons and holes

(ix) The reverse saturation current in junction diode is independent for the selection

    a) Potential barrier

    b) Junction area

    c) Doping of 'P' and 'N' type region

    d) Temperature

(x) In the operation of an NPN transistor, identify which region the electrons cross ?

    a) emitter region

    b) The region where there is high depletion

    c) the region where there is low depletion

    d) P type base region

(xi) When does the operation transistor act like an open switch?

    a) cut off region

    b) Active region

    c) saturated region

    d) None of these

(xii) Solution of $(11001)_2 - (10001)_2$ is shown as

    a) 10000

    b) 1000

    c) 100

    d) 1

(xiii) Binary subtraction of $100101 - 011110$ is represented as

    a) 111

    b) 10101

    c) 111000

    d) 101010

(xiv) A simple diode rectifier has 'ripples' in the output wave which makes it unsuitable as a DC source. To overcome this one can use for application of

    a) A capacitor in series with a the load resistance

    b) A capacitor in parallel to the load resistance

    c) Both (a) & (b)

    d) None of these

(xv) If peak voltage for a half wave rectifier circuit is 5V and diode cut in voltage is 0.7, then peak inverse voltage on diode will be determined as

    a) 4.3v

    b) 2v

    c) 2.3v

    d) 1v

Group-B
(Short Answer Type Questions)
3 x 5=15

2. Define CMRR. For the CMRR to be infinite what will be the condition? (3)
3. Describe OP-AMP as inverting Amplifier (3)
4. Illustrate characteristic of Ideal OPAMP? (3)
5. Write down the 3 sources of instability of collector current? (3)
6. Solve for X in $(135)_{12} = (X)_8 + (78)_9$ (3)

OR

Give implementation of XOR using minimum number of NAND gates with suitable explanation. (3)

Group-C
(Long Answer Type Questions)
5 x 6=30

7. i) Give a analysis Bridge Rectifier ii) Write notes on Ripple Factor (5)
8. Explain the theory of action of an OPAMP as an integrator. Draw the circuit diagram of practical integrator. (5)
9. Illustrate the theory of action of an OPAMP as a Differentiator. Draw the circuit diagram of practical Differentiator. (5)

10. Explain the input and output characteristics of a transistor in CC configuration. (5)
11. Distinguish between Drift current and Diffusion current in a semiconductor device? (5)
    Distinguish between conductors, semiconductors and insulators using energy band diagrams
12. i) Illustrate Nand gate. ii) Establish the action of Nand gate as Universal gate (5)

OR

i) Illustrate NOR gate. ii) Establish the action of NOR gate as Universal gate (5)

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