

(iii) The voltage gain of a transistor connected in _____ arrangement is the highest.

- (a) common base
 - (b) common collector
 - (c) common emitter
 - (d) None of the above
- (Choose the correct option)

(iv) Which of the following amplifiers has the highest linearity and lowest distortion ?

- (a) Class A
- (b) Class B
- (c) Class C
- (d) Class AB

(Choose the correct option)

(v) In an RC phase-shift oscillator, the frequency determining elements are _____.
(Fill in the blank)

(vi) Negative feedback in an OP-Amp increases the input impedance and bandwidth. (Write True or False)

(vii) A voltage follower has a voltage gain of _____.
(Fill in the blank)

2. Give short answers of the following questions : $2 \times 4 = 8$

(i) How are potential barrier and depletion region formed in a $p-n$ junction ?

(ii) Draw a capacitor filter circuit. How the value of capacitor is chosen in a shunt capacitor filter ?

(iii) In a CB transistor amplifier, if the collector current $I_C = 2 \text{ mA}$ and the base current $I_B = 0.04 \text{ mA}$, calculate the current amplification factors α and β respectively.

(iv) What are d.c and a.c load lines ? What do they specify ?

3. Answer the following questions : **(any three)**
 $5 \times 3 = 15$

(i) Draw a fixed biased circuit. Derive the expression for its stability factor. Mention the disadvantage of this circuit.
 $2 + 2 + 1 = 5$

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3 (Sem -4/CBCS) PHY HC 3

2023

PHYSICS

(Honours Core)

Paper : PHY-HC-4036

(Analog Systems and Applications)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed :
1 × 7 = 7

(i) The random motion of holes and free electrons due to thermal agitation is called _____. (Fill in the blank)

(ii) A photodiode is normally

- (a) forward biased
- (b) reverse biased
- (c) emitting light

(d) neither forward nor reverse biased
(Choose the correct option)

Contd.