| Reg. No. | | | | | | | | | | | | | |
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| Question Paper Code | 14047 |
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## B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Third Semester

### Electrical and Electronics Engineering

### 24EEPC303 - ANALOG ELECTRONICS

Regulations - 2024

Duration: 3 Hours                                              Max. Marks: 100

### PART - A (MCQ) (10 × 1 = 10 Marks)
#### Answer ALL Questions

| | | Marks | K–Level | CO |
|---|---|---|---|---|
| 1. | The CMRR of an ideal differential amplifier is ___. <br> (a) infinite (b) zero-bias (c) positive (d) negative | 1 | K1 | CO1 |
| 2. | _____ is the most common type of JFET biasing. <br> (a) Self biasing (b) Voltage biasing (c) Current biasing (d) All of the mentioned | 1 | K1 | CO1 |
| 3. | The Q point of Class B is in _____ <br> (a) Cut-off region (b) saturation region (c) active region (d) breakdown region | 1 | K1 | CO2 |
| 4. | Crossover distortion behavior is characteristic of _____ Power amplifier. <br> (a) Class A (b) Class AB (c) Class B (d) None of the mentioned | 1 | K1 | CO2 |
| 5. | The phase shift oscillator requires at least how many RC sections? <br> (a) 1 (b) 2 (c) 3 (d) 4 | 1 | K1 | CO3 |
| 6. | A Clapp oscillator is an improved version of: <br> (a) Hartley oscillator (b) Colpitts oscillator <br> (c) Wien bridge oscillator (d) Crystal oscillator | 1 | K1 | CO3 |
| 7. | Which op-amp configuration provides unity gain? <br> (a) Inverting amplifier (b) Non-inverting amplifier <br> (c) Voltage follower (d) Differentiator | 1 | K1 | CO4 |
| 8. | The input impedance of an ideal op-amp is: <br> (a) Zero (b) High (in the range of k$\Omega$) (c) Infinite (d) Very low | 1 | K1 | CO4 |
| 9. | A sample-and-hold circuit is essential in ADCs because: <br> (a) ADCs take finite conversion time (b) It reduces noise <br> (c) It increases resolution (d) It eliminates need for DAC | 1 | K1 | CO5 |
| 10. | In Monostable mode, the output pulse width of 555 timer depends on: <br> (a) Only capacitor (b) Only resistor <br> (c) Both resistor and capacitor (d) Supply voltage | 1 | K1 | CO6 |

### PART - B (12 × 2 = 24 Marks)
#### Answer ALL Questions

| | | Marks | K–Level | CO |
|---|---|---|---|---|
| 11. | Compare BJT and FET. | 2 | K2 | CO1 |
| 12. | Draw the circuit for Dual Input Unbalanced Output. | 2 | K1 | CO1 |
| 13. | Define negative feedback. | 2 | K1 | CO2 |
| 14. | Compare class A and class B amplifier. | 2 | K2 | CO2 |
| 15. | Define barkhausen criteria. | 2 | K1 | CO3 |
| 16. | Compare oscillator and amplifier. | 2 | K2 | CO3 |
| 17. | List the important characteristics of an ideal operational amplifier. | 2 | K1 | CO4 |
| 18. | Draw the circuit diagram of an op-amp differentiator. | 2 | K1 | CO4 |
| 19. | Define sample and hold period of S/H circuit. | 2 | K1 | CO5 |
| 20. | Classify the ADC converters. | 2 | K2 | CO5 |
| 21. | List any two advantages of switching regulators when compared to linear regulators. | 2 | K1 | CO6 |
| 22. | Define line and load regulation. | 2 | K1 | CO6 |

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*     **14047**

**PART - C (6 × 11 = 66 Marks)**
Answer ALL Questions

23. a) Analyze the concept of stability in Voltage divider network using BJT and comment the stability against β variations.    *11*   *K3*   *CO1*

**OR**

   b) Construct the circuit diagram of a differential amplifier and list its various configurations with common mode gain and differential mode gain to derive CMRR.    *11*   *K3*   *CO1*

24. a) Apply the concept of Q point in Class-A Amplifier and derive the conversion efficiency.    *11*   *K3*   *CO2*

**OR**

   b) Construct the ClassAB push-pull power amplifier based on the conduction Q point and justify how the crossover distortion is eliminated. Also list the merits and demerits.    *11*   *K3*   *CO2*

25. a) Apply the concept of barkhausen criteria in wein bridge oscillator and derive the expression for the frequency of oscillation.    *11*   *K2*   *CO3*

**OR**

   b) Describe the construction and working of a Colpitts oscillator. Derive the expression for oscillation frequency and discuss its key characteristics.    *11*   *K2*   *CO3*

26. a) Explain the AC performance characteristics of an operational amplifier in detail.    *11*   *K3*   *CO4*

**OR**

   b) Construct the diagram for inverting and non inverting summing amplifier using OP-AMP and derive the output voltage.    *11*   *K3*   *CO4*

27. a) Analyze the operation of an instrumentation amplifier with a neat diagram    *11*   *K4*   *CO5*

**OR**

   b) Analyze the principle of operation of a Successive ApproximationADC with a neat diagram.    *11*   *K4*   *CO5*

28. a) With a neat diagram, explain the functional block diagram of a 555-timer-based Monostable multivibrator and apply the timing principles to derive the expression for its time delay.    *11*   *K2*   *CO6*

**OR**

   b) Explain the operation of fixed voltage regulators with the help of block diagrams. Apply the concepts to identify their typical applications.    *11*   *K2*   *CO6*