



# CBCS SCHEME

BEC303

Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

## Electronic Principles and Circuits

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. M : Marks , L: Bloom's level , C: Course outcomes.

| Module – 1        |    |  | M  | L  | C   |
|-------------------|----|--|----|----|-----|
| Q.1               | a. | Develop an expression for the operating point $I_C$ and $V_{CE}$ for the voltage divider bias circuit using approximate analysis. Hence calculate the operating point for the VDB circuit given :<br>$V_{CC} = 10V$ , $R_1 = 10K\Omega$ , $R_2 = 2.2 K\Omega$ , $R_C = 3.6K\Omega$ , $R_E = 1 K\Omega$ . | 10 | L3 | CO1 |
|                   | b. | For the voltage divider biased amplifier, derive the expression for the voltage gain from i) $\pi$ –Model ii) T –Model.  | 10 | L2 | CO1 |
| <b>OR</b>         |    |  |    |    |     |
| Q.2               | a. | Develop an expression for voltage gain and input impedance for an emitter follower with neat circuit diagram.  | 10 | L2 | CO1 |
|                   | b. | Determine the operating point for two supply emitter bias circuit given :<br>$V_{CC} = 10V$ , $R_C = 3.6 K\Omega$ , $R_B = 2.1 K\Omega$ , $R_E = 1 K\Omega$ and $-V_{EE} = -2V$ .  | 5  | L2 | CO1 |
|                   | c. | Develop an expression for the operating point $I_C$ and $V_{CE}$ for collector feedback bias circuit.  | 5  | L2 | CO1 |
| <b>Module – 2</b> |    |  |    |    |     |
| Q.3               | a. | With neat circuit diagrams, explain biasing of MOSFET by fixing the gate voltage.  | 10 | L2 | CO2 |
|                   | b. | With neat circuit diagram, develop an expression for voltage gain, input impedance and output impedance for common source amplifier with source resistance.  | 10 | L2 | CO2 |
| <b>OR</b>         |    |  |    |    |     |
| Q.4               | a. | With neat circuit diagram, develop an expression for voltage gain, input impedance and output impedance for common gate amplifier.   | 10 | L2 | CO2 |
|                   | b. | Define transconductance and hence develop any three expressions for transconductance.  | 10 | L2 | CO4 |

## Module – 3

|     |    |  |   |    |     |
|-----|----|--|---|----|-----|
| Q.5 | a. | With neat circuit diagram, explain the operation of R-2R digital to analog converter.  | 6 | L2 | CO4 |
|     | b. | For the circuit shown in Fig.Q5(b) the input voltage is a sine wave with peak value of 10V. What is the trip point of the circuit? Determine the cut off frequency of bypass capacitor. Also draw the input output waveform. | 6 | L3 | CO4 |

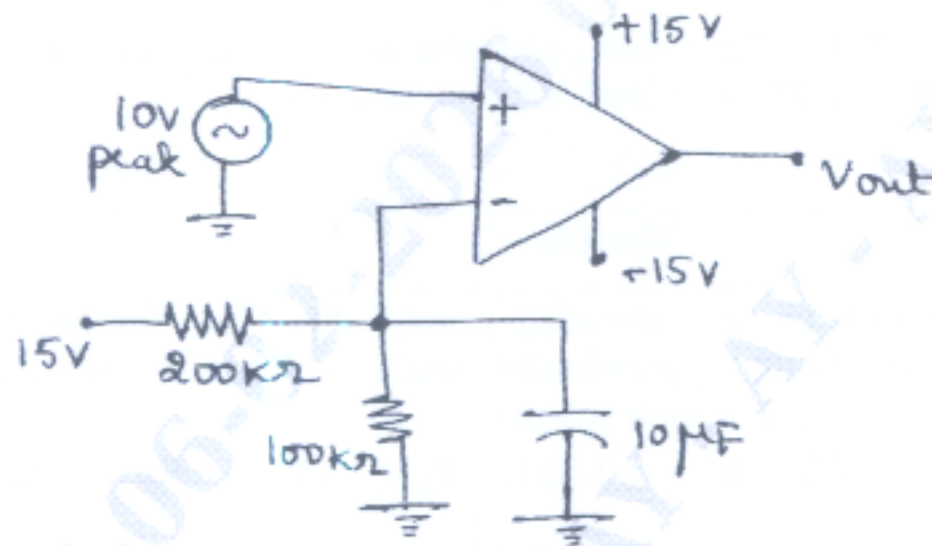


Fig.Q5(b)

|  |    |  |   |    |     |
|--|----|--|---|----|-----|
|  | c. | Explain the operation of inverting Schmitt-trigger with neat circuit diagram and waveform. | 8 | L2 | CO4 |
|--|----|--|---|----|-----|

## OR

|     |    |  |    |    |     |
|-----|----|--|----|----|-----|
| Q.6 | a. | Make use of the concept of lead-lag circuit to explain the operation of Wein bridge oscillator.            | 10 | L2 | CO4 |
|     | b. | Explain the operation of Astable Multi-Vibrator using 555 timer with internal block diagram and waveforms. | 10 | L2 | CO3 |

## Module – 4

|     |    |   |   |    |     |
|-----|----|---|---|----|-----|
| Q.7 | a. | With neat block diagram, explain four types of negative feedback circuit.   | 8 | L2 | CO3 |
|     | b. | For the circuit shown in Fig.Q7(b), calculate the feedback fraction, the ideal closed loop voltage gain, the percent error and the exact closed loop voltage gain, use the open loop gain of 741C as 100,000. | 6 | L2 | CO3 |

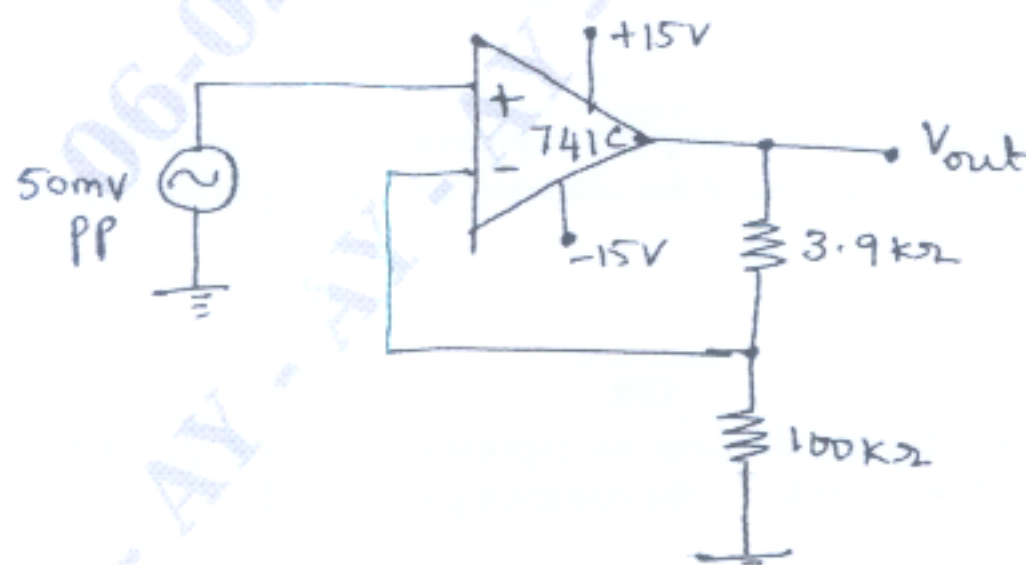


Fig.Q7(b)

|  |    |  |   |    |     |
|--|----|--|---|----|-----|
|  | c. | With neat circuit diagram and equations, explain the operation of a current amplifier. | 6 | L2 | CO3 |
|--|----|--|---|----|-----|

OR

|     |    |  |    |    |     |
|-----|----|--|----|----|-----|
| Q.8 | a. | Classify filters and explain each filter with its ideal frequency response.  | 10 | L2 | CO3 |
|     | b. | What is First Order Filters? Explain the various implementation of first order low pass and high pass active filters with expressions. | 10 | L2 | CO3 |

Module – 5

|     |    |  |    |    |     |
|-----|----|--|----|----|-----|
| Q.9 | a. | Explain the operation of class-B push pull emitter follower amplifier with its advantages and disadvantages. | 10 | L2 | CO5 |
|     | b. | Discuss the concepts of DC and AC load line taking voltage divider bias amplifier as an example.             | 10 | L2 | CO5 |

OR

|      |    |   |    |    |     |
|------|----|---|----|----|-----|
| Q.10 | a. | Explain the working of SCR phase control with the help of circuit and waveform.               | 10 | L2 | CO5 |
|      | b. | Explain the construction, control and advantages of Insulated-Gate Bipolar Transistor (IGBT). | 10 | L2 | CO5 |

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