Total No. of Questions: 25

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

EC3CO03 Electronic Devices & Circuits

Programme	:	B.Tech.	**Branch/Specialisation**	:	EC
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. The diffused impurities with _____ valence electrons are called donor atoms. **1 1 1**

- ○ 4
- ○ 3
- ◉ 5
- ○ 2

Q2. Schottky diodes are also known as- **1 1 1**

- ○ PIN diodes
- ◉ Hot carrier diodes
- ○ Step-recovery diodes
- ○ Tunnel diodes.

Q3. A transistor has a β_{DC} of 250 and a base current, I_B, of 20μA. The collector current, I_C, equals: **1 2 1**

- ○ 500 μA
- ◉ 5 mA
- ○ 50mA
- ○ 5A

Q4. When transistors are used in digital circuits they usually operate in the: **1 2 1**

- ○ Active region
- ○ Breakdown region
- ◉ Saturation and cut off regions
- ○ Linear region

Q5. A JFET is also called _____ transistor. **1 3 1**

- ◉ Unipolar
- ○ Bipolar
- ○ Unijunction
- ○ None of the above

Q6. With the E-MOSFET, when gate input voltage is zero, drain current is: **1 3 1**

- ○ At saturation
- ◉ Zero
- ○ IDSS
- ○ Widening the channel

Q7. What should be the value of input resistance for an ideal voltage amplifier circuit? **1 4 1**

- ○ Zero
- ○ Unity
- ◉ Infinity
- ○ Unpredictable

Q8. Why is RC coupling confined to low power applications? **1 4 1**

- ○ Due to large value of coupling capacitor
- ◉ Low efficiency
- ○ Large number of components
- ○ Due to is frequency response

Q9. In an LC oscillator, the frequency of oscillator is _____ L or C. **1 5 1**

- ○ Proportional to square of
- ○ Directly proportional to
- ○ Independent of the values of
- ◉ Inversely proportional to square root of

Q10. Only the condition βA = _____ must be satisfied for self-sustained oscillations to result. **1 5 1**

- ◉ 1
- ○ 0
- ○ -1
- ○ None of the above

Section 2 (Answer all question(s))

Marks CO BL

Q11. Define diffusion and drift current. **2 1 1**

Rubric	Marks
Define diffusion current.	1
Define drift current.	1

Q12. Explain the Hall effect. **3 1 1**

Q13. (a) Draw and explain the full wave center tapped rectifier circuit and also derive the expression for their efficiency. **5 2 1**

Rubric	Marks
Draw and explain the full wave center tapped rectifier circuit.	2
For full wave center tapped rectifier circuit drive the expression for their efficiency.	3

(OR)

(b) Draw and explain the V I characteristic of Tunnel diode. Explain the tunnelling phenomenon.

Rubric	Marks
Draw the V I characteristic of Tunnel diode.	2
explain the V I characteristic of Tunnel diode.	3

Section 3 (Answer all question(s))

Marks CO BL

Q14. Explain dc load line of transistor. **2 2 1**

Q15. Derive relation between α, β and ϒ in transistor. **3 2 1**

Q16. (a) Explain the input and output characteristics of transistor in CE configuration. Also explain the reigons of operation. **5 2 1**

(OR)

(b) Explain the h parameter model and find out input impedance, voltage gain and current gain in terms of h parameter.

Section 4 (Answer all question(s))

Marks CO BL

Q17. What is pinch off condition? **2 3 1**

Q18. Write down the difference between BJT and FET. (any3) **3 3 2**

Q19. (a) Explain the working principal of n channel JFET with their characteristics. **5 3 1**

Rubric	Marks
Explain the working principal of n channel JFET .	2
Characteristics of n channel JFET .	3

(OR)

(b) Explain the working principal of n channel enhancement type MOSFET with their characteristics.

Rubric	Marks
Draw construction diagram of n channel Enhancement type MOSFET.	2
Explain n channel Enhancement type MOSFET the working principal with their characteristics.	3

Section 5 (Answer any 2 question(s))

Marks CO BL

Q20. With the help of circuit diagram and waveform explain the operation of class B push pull power amplifier. Calculate its maximum power efficiency. **5 3 3**

Rubric	Marks
Circuit diagram a of class B push pull power amplifier.	2
Draw waveform explain the operation of class B push pull power amplifier.	3

Q21. Explain the working of darlington pair amplifier. Why bootstrapping is done? **5 4 3**

Q22. Draw and explain the working of RC coupled amplifier. **5 4 1**

Section 6 (Answer any 2 question(s))

Marks CO BL

Q23. Explain various feedback topologies. Also derive an expression for input and output resistance for any one them. **5 4 3**

Q24. Explain the working of Hartley oscillators. Also derive an expression for frequency of oscillation. **5 5 3**

Q25. Explain the concept of feedback. Which feedback is generally used and why? **5 5 3**

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