Total No. of Questions: 21

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

EC3CO25 Analog Electronics

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. A hole in a semiconductor is defined as _____. **1 1 1**

Rubric	Marks
The incomplete part of electron bond pair	1

- ○ A free electron
- ○ A free proton
- ◉ The incomplete part of electron bond pair
- ○ A free neutron

Q2. Which of the following parameter describes the best movement of the electrons inside a semiconductor? **1 1 1**

Rubric	Marks
Mobility	1

- ○ Velocity gradient
- ○ Diffusion
- ○ Density gradient
- ◉ Mobility

Q3. If biasing is not done in an amplifier circuit, it results in _____. **1 2 1**

Rubric	Marks
Unfaithful amplification	1

- ○ Decrease in the base current
- ◉ Unfaithful amplification
- ○ Excessive collector bias
- ○ None of these

Q4. A transistor is said to be in quiescent state when- **1 2 1**

Rubric	Marks
No signal is applied to the input	1

- ○ It is unbiased
- ○ No current flows through it
- ○ Emitter junction is just biased equal to collector junction
- ◉ No signal is applied to the input

Q5. Which of the following statement is true about FET? **1 3 1**

Rubric	Marks
It has high input impedance	1

- ○ It has high output impedance
- ◉ It has high input impedance
- ○ It has low input impedance
- ○ It does not offer any resistance

Q6. For D MOSFET, when biased at V_{GS}=0V having I_{DSS}= 30 mA and V_{GS}(off)=-6V,the drain current is equal to- **1 3 1**

Rubric	Marks
30mA	1

- ○ 0 mA
- ○ Infinite
- ○ 20 mA
- ◉ 30 mA

Q7. Negative feedback in an amplifier improves: **1 4 1**

Rubric	Marks
Reduces distortion	1

- ◉ The signal to noise ratio at the output
- ○ Reduces distortion
- ○ Both (A) and (B)
- ○ None of the above

Q8. Low frequency oscillators have a frequency range of _____. **1 4 1**

- ◉ Below 20Hz
- ○ 20 Hz -100k Hz
- ○ 1 Hz -20k Hz
- ○ 50 Hz -100k Hz

Q9. If ground is applied to the (+) terminal of an inverting op-amp, the (–) terminal will- **1 5 1**

Rubric	Marks
Virtual ground	1

- ○ Not need an input resistor
- ◉ Virtual ground
- ○ Have high reverse current
- ○ Not invert the signal

Q10. An ideal op-amp requires infinite bandwidth because- **1 5 2**

Rubric	Marks
Signals can be amplified without attenuation	1

- ◉ Signals can be amplified without attenuation
- ○ Output common-mode noise voltage is zero
- ○ Output voltage occurs simultaneously with input voltage changes
- ○ Output can drive infinite number of device

Section 2 (Answer all question(s))

Marks CO BL

Q11. What is the effect of temperature change on the resistance and capacitance of PN junction diode? **3 1 2**

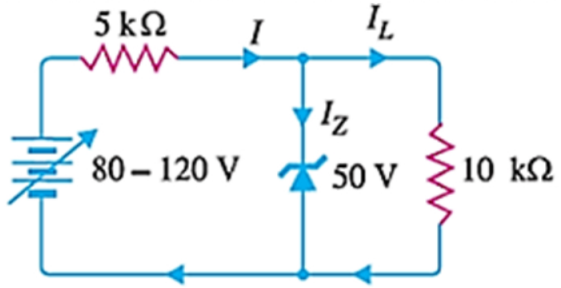
Rubric	Marks
effect on resistance 1.5 marks and	1.5
effect on capacitance 1.5 marks	1.5

Q12. (a) Explain the working of full wave rectifier under following heads: (i) Ripple factor, (ii) Efficiency (iii) TUF. **7 1 1**

Rubric	Marks
1 marks diagram for diagram	1
2 marks for ripple factor	2
2 marks for efficiency	2
2 marks for TUF	2

(OR)

(b) How a zener diode can work as a voltage regulator. For the circuit shown in Fig. 2 (i),find the maximum and minimum values of zener diode current.



Rubric	Marks
3 marks for working as regulator	3
4 marks for numerical	4

Section 3 (Answer all question(s))

Marks CO BL

Q13. Why base region is lightly doped and small in size? Explain the working of a transistor as an amplifier. **4 2 2**

Rubric	Marks
1 marks for reason	1
3 marks for working	3

Q14. (a) How BJT works as an amplifier? **6 2 1**

(OR)

(b) Explain CB configuration transfer characteristics.

Section 4 (Answer all question(s))

Marks CO BL

Q15. Why FET is called as voltage controlled device? A JFET has a drain current of 5mA. If I_{DSS} =10 mA and $V_{GS(OFF)}$=6V, calculate the value of V_{GS} and pinch-off voltage. **4 3 4**

Rubric	Marks
1 marks for reason	1
3 marks for numerical	3

Q16. (a) Which MOSFET is known as generally ON MOSFET? Explain the working of E-MOSFET with labelled diagram. **6 3 1**

Rubric	Marks
1 marks for type of MOSFET	1
5 marks for working	5

(OR)

(b) How a FET can behave as a voltage variable resistor. Explain through its characteristics.

Rubric	Marks
6 marks for its characteristics	6

Section 5 (Answer all question(s))

Marks CO BL

Q17. What is the difference between a voltage amplifier and power amplifier? **3 4 2**

Rubric	Marks
1marks for each difference	3

Q18. (a) Design a negative feedback amplifier circuit with its gain expression. Also explain its advantages. **7 4 1**

Rubric	Marks
4 marks for designing	4
3 marks for advantages	3

(OR)

(b) What is the criterion for oscillation? Design a Wein bridge oscillator.

Rubric	Marks
1 marks for criterion	1
6 marks for wein bridge	6

Section 6 (Answer any 2 question(s))

Marks CO BL

Q19. Explain the following characteristics of an Op-Amp- **5 5 3**

- Slew rate
- Output offset voltage
- Input Bias current
- CMRR

Rubric	Marks
2 marks for sleww rate	2
1 each marks for others	3

Q20. Explain the working of Op-Amp as a comparator. Which type of feedback is used and why? **5 5 4**

Rubric	Marks
3 marks for working as comparator	3
2 marks for type of feedback	2

Q21. Explain the working of 555 timer as monostable multivibrator. Also draw the block diagram of 555 timer. **5 5 4**

Rubric	Marks
1marks for block diagram	1
4 marks for working	4

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