Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec 2024
EC3CO25 Analog Electronics

Programme: B.Tech. Branch/Specialisation: EC

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	The value of barrier potential for Ge diode is - (a) 0.1 V (b) 0.3 V (c) 0.5 V (d) 0.7 V	**1**	1	1	1	1
	ii.	The energy gap in energy band diagram of semiconductor is approximately equal to – (a) 0.1 eV (b) 0.5 eV (c) 0.7 eV (d) 1 eV	**1**	1	1	1	1
	iii.	Transistor is used as an amplifier in – (a) Common base configuration in cut off mode (b) Common emitter configuration in cut off mode (c) Common base configuration in forward active mode (d) Common emitter configuration in forward active mode	**1**	2	1	3	1
	iv.	Which region of transistor is large in size? (a) Emitter (b) Base (c) Collector (d) All are equal	**1**	1	1	1	1
	v.	FET is – (a) Voltage controlled device (b) Current controlled device (c) Power controlled device (d) Depend on designing	**1**	2	1	2	1

P.T.O.

vi.	For the operation of depletion type MOSFET in depletion mode, the gate voltage has to be – (a) Low positive (b) High positive (c) High negative (d) Zero	**1**	2	1	4	1
vii.	In a current-series feedback amplifier, the input resistance – (a) Increases (b) Decreases (c) Remains unchanged (d) Tends to zero	**1**	2	1	1	1
viii.	For sustaining oscillations in an oscillator, the loop gain should be – (a) Negative (b) Zero (c) Less than unity (d) Greater than unity	**1**	1	1	5	1
ix.	Which one is incorrect for OPAMP – (a) Having infinite gain (b) Having zero CMRR (c) Having infinite i/p resistance (d) Having zero o/p resistance	**1**	2	1	1	1
x.	The voltage gain of non-inverting OPAMP is – (a) Negative (b) Zero (c) Less than unity (d) Greater than unity	**1**	2	1	1	1

Q.2	i.	Define ripple factor.	**2**	1	1	5	1
	ii.	Explain semiconductor with the help of energy band diagram.	**3**	2	1	2	1
	iii.	Explain operation of LED with the help of diagram and write its applications.	**5**	2	1	3	1
OR	iv.	Explain Zener diode as a voltage regulator with the help of V-I characteristics.	**5**	3	1	3	1
Q.3	i.	What is early effect.	**2**	1	1	3	1
	ii.	Explain three regions of operations of BJT with diagram for CB configuration.	**3**	1	1	2	1
	iii.	Draw and explain voltage divider bias circuit and derive an expression for its stability factor.	**5**	3	1	3	1
OR	iv.	Explain input and output characteristics of transistor in CB configuration.	**5**	3	1	3	1

Q.4	i.	What is pinch off voltage?	**2**	1	1	3	1
	ii.	Which MOSFET is known as Normally-ON MOSFET and why?	**3**	2	1	3	1
	iii.	Draw and explain drain characteristics of depletion type MOSFET.	**5**	2	1	3	1
OR	iv.	Draw and explain transfer characteristics of depletion type MOSFET.	**5**	2	1	3	1
Q.5	i.	What is Barkhausen criterion?	**2**	2	1	5	1
	ii.	Write advantages and disadvantages of negative feedback.	**3**	2	1	5	1
	iii.	Draw push pull amplifier circuit and explain its working. Also write its two advantages.	**5**	3	1	5	1
OR	iv.	Explain the operation of RC phase shift oscillator with the help of neat circuit diagram.	**5**	3	1	5	1
Q.6		Attempt any two:					
	i.	Draw block diagram of OPAMP and explain each block.	**5**	2	1	1	1
	ii.	Explain OPAMP as an integrator and differentiator.	**5**	3	1	5	1
	iii.	Draw and explain monostable multivibrator circuit using 555 timer IC.	**5**	3	1	5	1

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Marking Scheme
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Q.1	i)	(b) 0.3 V	**1**
	ii)	(d) 1 eV	**1**
	iii)	(d) Common emitter configuration in forward active mode	**1**
	iv)	(c) Collector	**1**
	v)	(a) Voltage controlled device	**1**
	vi)	(c) High negative	**1**
	vii)	(a) Increases	**1**
	viii)	(d) Greater than unity	**1**
	ix)	(b) Having zero CMRR	**1**
	x)	(d) Greater than unity	**1**

Q.2	i.	Define ripple factor – 2	**2**
	ii.	Explain semiconductor – 2 energy band diagram – 1	**3**
	iii.	Explain operation of LED – 3 with the help of diagram – 1 write its applications – 1	**5**
OR	iv.	Zener diode as a voltage regulator – 3 with the help of V-I characteristics – 2	**5**

Q.3	i.	Early effect – 2	**2**
	ii.	Three regions of operations of BJT with diagram for CB configuration – 1 mark for each	**3**
	iii.	Draw and explain voltage divider bias circuit – 3 derive an expression for its stability factor – 2	**5**
OR	iv.	Input characteristics of transistor in CB configuration – 2.5 Output characteristics of transistor in CB configuration – 2.5	**5**

Q.4	i.	Pinch off voltage – 2	**2**
	ii.	Which MOSFET is known as Normally-ON MOSFET – 1 Why – 2	**3**
	iii.	Draw drain characteristics of depletion type MOSFET – 2 Explain – 3	**5**
OR	iv.	Draw transfer characteristics of depletion type MOSFET – 2 Explain – 3	**5**

Q.5	i.	Barkhausen criterion – 2	**2**
	ii.	Advantages of negative feedback – 2 and disadvantages – 1	**3**
	iii.	Draw push pull amplifier circuit – 1 Explain its working – 3 Also write its two advantages – 1	**5**
OR	iv.	Operation of RC phase shift oscillator – 3 Neat circuit diagram – 2	**5**

Q.6		Attempt any two:	
	i.	Block diagram of OPAMP – 1 and explain each block – 4	**5**
	ii.	Explain OPAMP as an integrator – 2.5 and differentiator – 2.5	**5**
	iii.	Draw monostable multivibrator circuit using 555 timer IC – 2 and explain – 3	**5**

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