	iii.	Explain H-parameter model for CC- amplifier with diagram? Also derive expression of input and output impedance for it.	**5**
OR	iv.	What are the advantages of class B push-pull amplifier? Also discuss circuit arrangement and working of the same with neat diagram.	**5**
Q.6	i.	What is transfer gain of an amplifier with and without (negative) feedback?	**2**
	ii.	What are advantages of negative feedback amplifier? Calculate the gain of a negative feedback amplifier with an internal gain A_V=65 and feedback fraction m_v=1/13 and what will be the gain when A_v doubles?	**3**
	iii.	Compare positive and negative feedback? Derive formula for output impedance of current shunt feedback and current series feedback.	**5**
OR	iv.	Explain circuit arrangement and working of phase shift oscillator using NPN transistor with neat diagram.	**5**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2019

EC3CO03/EI3CO03 Electronic Devices and Circuits

Programme: B.Tech. Branch/Specialisation: EC/EI

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.

Q.1	i.	At Room temperature the current in intrinsic semiconductor is due to..... (a) Holes (b) Electrons (c) Ions (d) Holes and electrons	**1**
	ii.	In which of these devices reverse recovery time nearly zero? (a) Zener (b) Tunnel (c) Schottky (d) PIN	**1**
	iii.	A transistor has current gain of 0.99 in CB mode. Its current gain in CC mode ……. (a) 100 (b) 99 (c) 1.01 (d) None of these	**1**
	iv.	In active mode of a Bipolar Junction Transistor the base-collector junction has..... (a) Forward resistance (b) Reverse resistance (c) Zero bias (d) Zero and forward bias	**1**
	v.	MOSFET can be used as (a) Current controlled capacitor (b) Voltage controlled capacitor (c) Current controlled inductor (d) Voltage controlled inductor	**1**
	vi.	Saturation region of a JFET is also known as ..... region. (a) Pinch-off (b) Analog (c) Source (d) Ohmic	**1**
	vii.	In Cascading Amplifiers, the intermediate stage is... (a) CB (b) CC (c) CE (d) None of these	**1**

viii. In an amplifier, which conducts during the cycle from 0° to 90° and again from 180° to 270°, the amplifier will be termed as... **1**
(a) Class A (b) Class B (c) Class C (d) Class AB

ix. Which of following will not decrease as a result of introduction of negative feedback? **1**
(a) Instability (b) Bandwidth
(c) Overall gain (d) Distortion

x. In a Wein bridge Oscillator, the Positive feedback attenuation is **1**
(a) 1/3 (b) 1/29 (c) -29 (d) 3

Q.2 i. Define mobility and conductivity of charge carrier. **2**

ii. What is diode junction capacitance? Calculate dynamic forward and reverse resistance of a PN junction diode. When applied voltage is 0.25V at T=27°C and I_0=2μA. **3**

iii. Explain clipper and clamper circuit? Also determined output waveform of following clipper circuit. If υ_i is a triangular given in Fig. 1 **5**

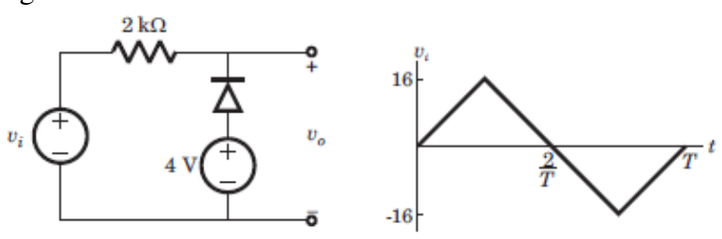

Fig. 1

OR iv. Explain the following: **5**
(a) Tunnel diode and its application
(b) Full wave (bridge) rectifier with input and output waveform

Q.3 i. What is necessity of biasing of Transistor? **2**

ii. Explain AC load line with diagram. **3**

iii. Describe what is thermal runway? A base bias circuit in Fig 1, is subjected to an increase in temperature from 25°C to 75°C. If β = 100 at 25°C and 150 at 75°C, determine the percentage change in Q-point values (V_{CE} and I_C) over this temperature range. Neglect any change in V_{BE} and the effects of any leakage current. **5**

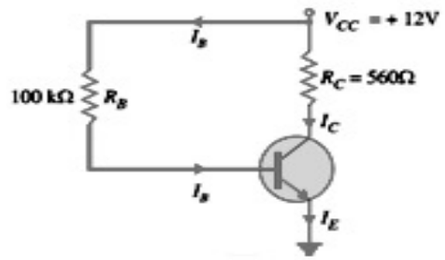

Fig.1

OR iv. Draw hybrid-pi model of BJT in CE configuration also discuss, transistor transconductance, input conductance, feedback conductance, base spreading resistance. **5**

Q.4 i. Compare features of BJT and FET. **2**

ii. Explain, how does current flow in N-channel JFET with diagram? **3**

iii. What is meant by threshold voltage? Draw and explain drain and transfer characteristics enhancement type MOSFET. **5**

OR iv. Determine the following for the network of Fig.2 shown. **5**
(a) V_{GSQ} (b) I_{DQ} (c) V_{DS} (d) V_S
(e) V_D

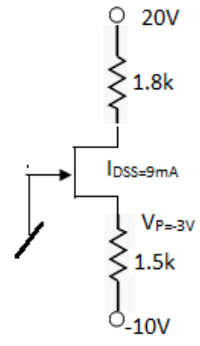

Fig.2

Q.5 i. Explain the function of coupling capacitor and bypass capacitor. **2**

ii. What is small signal amplifier? How are they different from large signal amplifier? **3**

P.T.O.

Marking Scheme

EC3CO03/EI3CO03 Electronic Devices and Circuits

Q.1	i.	At Room temperature the current in intrinsic semiconductor is due to..... (d) Holes and electrons		**1**
	ii.	In which of these devices reverse recovery time nearly zero? (c) Schottky		**1**
	iii.	A transistor has current gain of 0.99 in CB mode. Its current gain in CC mode ……. (a) 100		**1**
	iv.	In active mode of a Bipolar Junction Transistor the base-collector junction has..... (b) Reverse resistance		**1**
	v.	MOSFET can be used as (b) Voltage controlled capacitor		**1**
	vi.	Saturation region of a JFET is also known as ..... region. (a) Pinch-off		**1**
	vii.	In Cascading Amplifiers, the intermediate stage is... (c) CE		**1**
	viii.	In an amplifier, which conducts during the cycle from 0° to 90° and again from 180° to 270°, the amplifier will be termed as... (a) Class A (b) Class B (c) Class C (d) Class AB		**1**
	ix.	Which of following will not decrease as a result of introduction of negative feedback? (b) Bandwidth		**1**
	x.	In a Wein bridge Oscillator, the Positive feedback attenuation is (a) 1/3		**1**
Q.2	i.	Definition of mobility	1 mark	**2**
		Definition of conductivity of charge carrier	1 mark	
	ii.	Diode junction capacitance	1 mark	**3**
		Calculate dynamic forward and reverse resistance of a PN junction diode	2 marks	
	iii.	Clipper and clamper circuit	1 mark	**5**
		Determine output waveform	4 marks	
OR	iv.	Explain the following: (a) Tunnel diode and its application (b) Full wave (bridge) rectifier with input and output waveform	2.5 marks 2.5 marks	**5**
Q.3	i.	Necessity of biasing of Transistor		**2**
	ii.	AC load line	2 marks	**3**
		Diagram	1 mark	
	iii.	Thermal runway	1 mark	**5**
		Calculation of I_B and I_C at 25^0C	1 mark	
		Calculation of I_B and I_C at 75^0C	1 mark	
		% change of I_C and V_{CE}	2 marks	
OR	iv.	Diagram Explanation of all terms 1 mark for each (1 mark * 4)	1 mark 4 marks	**5**
Q.4	i.	Compare features of BJT and FET 0.5 mark for each comparison	 (0.5 mark * 4)	**2**
	ii.	Current flow in N-channel JFET	2 marks	**3**
		Diagram	1 mark	
	iii.	Threshold voltage	1 mark	**5**
		Explanation	2 marks	
		Diagram	2 marks	
OR	iv.	Determine the following for the network of Fig.2 shown. 1 mark for each calculation	 (1 mark * 5)	**5**
Q.5	i.	Function of coupling capacitor	1 mark	**2**
		Function of bypass capacitor	1 mark	
	ii.	Small signal amplifier	1 mark	**3**
		Difference large signal amplifier	2 marks	
	iii.	H-parameter model for CC- amplifier with diagram	2 marks	**5**
		Derivation of input	1.5 marks	
		Derivation of output	1.5 marks	
OR	iv.	Diagram and explanation	2 marks	**5**
		Circuit arrangement	1 mark	
		Working	1 mark	
		Diagram	1 mark	
Q.6	i.	Transfer gain of an amplifier with (negative) feedback	1 mark	**2**
		Without (negative) feedback	1 mark	
	ii.	Advantages of negative feedback amplifier		**3**
		0.5 mark for each (0.5 mark * 2)	1 mark	
		Calculate the gain of a negative feedback	2 marks	

	iii.	Difference b/w positive and negative feedback		**5**
		0.5 mark for each point (0.5 mark * 2)	1 mark	
		Output impedance of current shunt feedback	2 marks	
		Output impedance of current series feedback	2 marks	
OR	iv.	Phase shift oscillator using NPN transistor		**5**
		Circuit arrangement	2 marks	
		Working	2 marks	
		Diagram	1 mark	

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