Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2019

ME3EM02 Electronics Devices and Circuits

Programme: B.Tech. Branch/Specialisation: ME

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. A semiconductor is formed by which bonds **1**
(a) Covalent (b) Electrovalent
(c) Co-ordinate (d) None of these

ii. An n-type semiconductor is **1**
(a) Positively charged. (b) Negatively charged
(c) Electrically neutral. (d) None of these

iii. The battery connections required to forward bias a pn junction are **1**
(a) +ve terminal to p and –ve terminal to n
(b) -ve terminal to p and +ve terminal to n
(c) -ve terminal to p and –ve terminal to n
(d) None of these

iv. PN junction acts as a **1**
(a) Controlled switch. (b) Bidirectional switch.
(c) Unidirectional switch (d) None of these

v. Rectifier converts **1**
(a) AC to DC supply. (b) DC to AC supply.
(c) AC to AC supply. (d) None of these

vi. Rectifier efficiency can be calculated as **1**
(a) The ratio of d.c. power output to the applied input a.c. power
(b) The ratio of a.c. power output to the applied input d.c. power
(c) The ratio of a.c. power output to the applied input a.c. power
(d) None of these

vii. FET stands for **1**
(a) Field effect transistor. (b) Far effective transmitter.
(c) Field effect transmitter. (d) None of these.

viii. BJT is a kind of **1**
(a) Bipolar device. (b) Unipolar device.
(c) Both (a) and (b) (d) None of these

P.T.O.

ix. Example of the +ve feedback is **1**
(a) Oscillator (b) Amplifier
(c) Both (a) and (b) (d) None of these

x. Which feedback provides stability **1**
(a) +ve (b) –ve
(c) Both (a) and (b) (d) None of these

Q.2 i. What is semiconductor materials? Give the four examples of it. **2**
ii. Discuss the Hall effects. **3**
iii. Discuss the classifications of solid in details. **5**
OR iv. Explain the different between Intrinsic and extrinsic semiconductors. **5**

Q.3 i. Brief introduction about the Zener diode. **2**
ii. Discuss the Tunnel diode, also discuss the –ve resistance region in the tunnel diode. **8**
OR iii. What is LED? A circuit has source voltage 15 volt and source resistance is 2.2 killo-volt, the voltage drop across the LED is 2 volts. Calculate the source current of the circuit. **8**

Q.4 i. Explain the ripple factor. **3**
ii. Discuss Clipper circuit with an example. **7**
OR iii. Show the comparison between Half wave rectifier and Full wave rectifier. **7**

Q.5 i. Explain Thermal Stabilization. **4**
ii. Write down about the need for biasing in detail. **6**
OR iii. Show the comparison between JFET and MOSFET. **6**

Q.6 Attempt any two:
i. What is feedback? Derive the expression of gain for both positive and negative feedback system respectively. **5**
ii. An amplifier with voltage gain of 60 dB uses 1/20th of its output in negative feedback. Determine the gain with feedback in dB. **5**
iii. Write down the five differences between positive and negative feedback system. **5**

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Marking Scheme
ME3EM02 Electronics Devices and Circuits

Q.1	i.	A semiconductor is formed by which bonds (a) Covalent		**1**
	ii.	An n-type semiconductor is (c) Electrically neutral.		**1**
	iii.	The battery connections required to forward bias a pn junction are (a) +ve terminal to p and –ve terminal to n		**1**
	iv.	PN junction acts as a (c) Unidirectional switch		**1**
	v.	Rectifier converts (a) AC to DC supply.		**1**
	vi.	Rectifier efficiency can be calculated as (a) The ratio of d.c. power output to the applied input a.c. power		**1**
	vii.	FET stands for (a) Field effect transistor.		**1**
	viii.	BJT is a kind of (a) Bipolar device.		**1**
	ix.	Example of the +ve feedback is (a) Oscillator		**1**
	x.	Which feedback provides stability (b) –ve		**1**
Q.2	i.	Semiconductor materials Four examples	1 mark 1 mark	**2**
	ii.	Hall effects		**3**
	iii.	Classifications of solid		**5**
OR	iv.	Difference between Intrinsic and extrinsic semiconductors Any five difference 1 mark for each	 (1 mark *5)	**5**
Q.3	i.	Zener diode.		**2**
	ii.	Tunnel diode –ve resistance region in the tunnel diode	4 marks 4 marks	**8**
OR	iii.	LED Calculate the source current of the circuit	4 marks 4 marks	**8**
Q.4	i.	Ripple factor.		**3**
	ii.	Clipper circuit with an example Stepwise marking		**7**
OR	iii.	Comparison between Half wave rectifier and Full wave rectifier Any seven comparison 1 mark for each	 (1 mark * 7)	**7**
Q.5	i.	Explain Thermal Stabilization.		**4**
	ii.	Need for biasing Any six need 1 mark for each	 (1 mark * 6)	**6**
OR	iii.	Comparison between JFET and MOSFET Any six comparison 1 mark for each	 (1 mark * 6)	**6**
Q.6		Attempt any two:		
	i.	Feedback Expression of gain for positive feedback system Expression of gain for negative feedback system	1 mark 2 marks 2 marks	**5**
	ii.	Determine the gain with feedback in dB. Stepwise marking		**5**
	iii.	Five differences between positive and negative feedback system 1 mark for each difference	 (1 mark *5)	**5**

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