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Code No. : 13416

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (ECE: CBCS) III-Semester Main Examinations, December-2018**

**Electronic Materials and Devices**

Time: 3 hours

Max. Marks: 60

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

Q. No	Stem of the Question	M	L	CO	PO
<b>Part-A (10 × 2 = 20 Marks)</b>					
1.	Compare PN and Schotkey Contacts.	2	2	1	1
2.	The current flowing through an ideal reverse biased PN junction diode is found to be 0.4μA for a large reverse biased voltage. Calculate the current and the dynamic resistance of the diode when it is forward biased by 0.5v.	2	3	1	1
3.	What is peak inverse voltage? Compare its value for HWR and FWR.	2	1	2	1
4.	Inductive filter cannot be connected in parallel to a rectifier. Justify.	2	2	2	2
5.	How are the BJT junctions biased in cut off, active and saturation regions?	2	2	6	1
6.	Calculate collector current I <sub>c</sub> , given I <sub>B</sub> = 5 μA, Beta = 100 and I <sub>co</sub> =10 nA.	2	3	6	1
7.	Draw the symbol of DIAC and TRIAC and differentiate between the two.	2	2	3	1
8.	How can h-parameters be obtained from the input output characteristics graph.	2	2	4	1
9.	Define transconductance of JFET and obtain its expression.	2	2	5	1
10.	List the advantages of FET over BJT.	2	2	5	1
<b>Part-B (5 × 8=40 Marks)</b>					
11. a)	What is voltage regulation? Can a normal diode be used to design a voltage regulator, Justify your answer?	4	4	4	2
b)	Explain the VI characteristics of a diode with its current equation. Obtain the value of diode (Silicon) current at room temperature given I <sub>o</sub> =10nA and V=0.7 V.	4	3	1	2
12. a)	Explain the bridge rectifier operation and obtain expression of its efficiency.	4	2	2	1
b)	Consider the full wave bridge rectifier with a chock input filter. Suppose 'R' represents the summation of the chock resistance, the forward resistance of the diode and the resistance of the transformer winding. If N <sub>1</sub> :N <sub>2</sub> =5: 1, R=125Ω, R <sub>L</sub> =1KΩ, L=20H and the input to the transformer primary coil is V <sub>1</sub> =220 Volts sinusoidal AC with frequency 50Hz. Calculate dc current, ripple factor and percentage regulation.	4	3	2	2
13. a)	What is Thermal Runaway? And explain the methods used to avoid thermal runaway situation in BJT circuits.	5	2	6	1
b)	In a transistor circuit load resistance is 5kΩ and Collector current is 1.2mA. Determine the operating point when the battery voltage V <sub>cc</sub> =12V. How will the Q-point change when the load resistance is changed from 5kΩ to 7.5kΩ.	3	4	6	2

14. a)	Draw h-parameter model of BJT in Common Emitter mode and explain each parameter.	4	2	5	1
b)	Calculate the current gain, Input impedance, Voltage Gain and output Impedance of an amplifier for given $h_{fe}=50$ , $h_{ie}=2000\Omega$ , $h_{re}=1.6*10^{-4}$ , $h_{oe}=50\mu A/V$ and $R_L = 8Kohm$ .	4	3	5	2
15. a)	Draw the structure of EMOS FET and explain its operations.	5	2	6	1
b)	What is the source self-bias circuit for JFET and why is it called so? Obtain the expression of $V_{ds}$ and $I_D$ for a source self-bias circuit.	3	2	6	1
16. a)	Derive the expression of junction capacitance (depletion) of a diode.	4	2	1	1
b)	Draw and explain the Full Wave Rectifier Circuit with L section filter and obtain its ripple factor.	4	2	2	1
17.	Answer any <i>two</i> of the following:				
a)	Analysis and compare CB, CE, and CC amplifier configurations of voltage gain, current gain, input resistance and output resistance. Give typical values in each case. Explain Why CE amplifier configuration is most popular for audio frequency applications.	4	4	5	2
b)	Explain the behaviour of UJT in negative resistance region. Give a few applications of UJT.	4	2	3	2
c)	Write short notes on CMOS.	4	2	5	1

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	66
2	Knowledge on application and analysis (Level-3 & 4)	34
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	---

