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Code No. : 13352 S N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) III-Semester Supplementary Examinations, August-2023

Electronics Engineering-I

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PSO
1.	A Germanium diode has reverse saturation current of $30 \mu\text{A}$ at 125°C . What is reverse resistances for a bias 0.3 V at this temperature?	2	1	1	2	2
2.	Write ideal values of rectifier parameters.	2	1	2	1	2
3.	Explain briefly early effect concept in BJT.	2	1	1	1	2
4.	Explain the significance of operating point.	2	1	1		2
5.	List out the parameters of hybrid model.	2	1	4	1	2
6.	Compare CB and CE amplifier configurations.	2	1	4	1	2
7.	Define the pinch-off voltage V_p and Sketch the depletion region before and after pinch-off in N channel JFET.	2	1	2	1	2
8.	An N channel JFET has $I_{DSS}=8\text{mA}$ and $V_p=-6\text{V}$. Determine the I_{DS} for $V_{gs}=-2\text{V}$ in the pinch-off region.	2	4	2	2	2
9.	Define hold current and latch current in SCR.	2	1	3	1	2
10.	Mention the procedure how frequency can be measured using a CRO.	2	2	3	1	2
Part-B (5 × 8 = 40 Marks)						
11. a)	A silicon single phase full wave bridge rectifier circuit is shown below. Explain what happens if the transformer and the load positions are interchanged?	4	3	2	2	2
b)	A Si diode indicates forward current of 2 mA and $10 \mu\text{A}$, when diode voltages are 0.6 V and 0.7 V respectively. Estimate the operating temperature of the diode junction.	4	2	1	2	2

12. a)	Briefly explain the operation of fixed bias circuit using BJT.	4	2	1	1	2
b)	If the various parameters of a CE amplifier, which use the voltage divider bias method are $V_{cc} = 16\text{ V}$, $R_1 = 56\text{ K}\Omega$, $R_2 = 20\text{ K}\Omega$, $R_c = 3\text{ K}\Omega$, $R_E = 2\text{ K}\Omega$ and $\beta = 66$. Find Q-point and the stability factor, assuming the transistor to be of Germanium.	4	4	4	2	2
13. a)	A CE amplifier has the h-parameters given by $h_{ie} = 1000\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25\mu\text{mhos}$. If both load and source resistances are $1\text{ k}\Omega$. Determine the i) Current gain ii) Input impedance iii) Voltage gain iv) Output Impedance.	4	4	4	2	2
b)	Justify how h-parameter exact model of bipolar transistor can be converted to simplified model?	4	3	4	2	2
14. a)	An N-channel JFET has $I_{DSS} = 12\text{ mA}$ and the transconductance of 4 mA/V when $V_{GS} = 0\text{ Volts}$. i) Find the pinch off voltage, V_p . ii) Find the drain current when $V_{GS} = -2\text{ volts}$	4	4	5	2	2
b)	Explain the operation of N- Channel Enhancement mode MOSFET and Draw VI-Characteristics.	4	2	5	1	2
15. a)	Draw and discuss SCR V-I characteristics.	4	2	3	1	2
b)	Explain the working principle of Light Emitting Diode.	4	2	3	1	2
16. a)	A half wave rectifier has a load of $3.5\text{ K}\Omega$. If the diode resistance and the secondary coil resistance together have a resistance of 800Ω and the input voltage has a signal voltage of peak value 240 V , Calculate: a) peak, average and rms value of current b) d.c. power output c) a.c. power input d) efficiency and ripple factor of the rectifier.	4	4	2	2	2
b)	Explain the operation of PN junction Diode with the help of VI-Characteristics in Forward and Reverse bias conditions.	4	2	1	1	2
17.	Answer any <i>two</i> of the following:					
a)	A CE amplifier is driven by a voltage source of internal resistance $R_S = 800\Omega$ and the load impedance is $R_L = 1000\Omega$ the h-parameters are $h_{ie} = 1\text{ k}\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25\mu\text{mhos}$. Compute the Current gain A_i , Input resistance R_i , Voltage gain A_v and Output resistance R_o .	4	4	4	2	2
b)	Compare between BJT and JFET.	4	2	1	1	2
c)	Explain the V-I Characteristics of Tunnel diode with the help of energy band diagrams.	4	2	3	1	2

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

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	42.5%
iii)	Blooms Taxonomy Level - 3 & 4	37.5%
