

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BTECH
BRANCH: EEE**

**SEMESTER : V
SESSION : MO/2023**

SUBJECT: EE357 ELECTRONIC DEVICES AND ANALOG CIRCUITS

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Explain the construction and working of PN junction diode. Discuss the temperature dependence of the VI characteristics of a PN junction diode.	[5] 1	2, 3
Q.1(b)	Mention the advantages of a full-wave rectifier over a half-wave rectifier? Explain V_Z , P_Z , I_{ZM} and r_z of Zener diode with expressions.	[5] 1	2,3
Q.2(a)	Define all the three stability factors. Draw a BJT fixed bias circuit and derive the expression for the stability factor 'S'.	[5] 2	1,4
Q.2(b)	In what respect, a JFET differs from MOSFET ? Define transconductance of JFET. A JFET has $V_P = -4.5V$, $I_{DSS} = 10mA$ and $I_D = 2.5 mA$. Determine the transconductance.	[5] 2	1,5
Q.3(a)	Draw the h-parameter equivalent circuit for a linear four terminal network. Write the equations relating input and output variables. Define all the h-parameters for a CE-configuration.	[5] 3	2,4
Q.3(b)	Make a neat diagram of hybrid π model and explain all its parameters. Define f_β and f_T .	[5] 3	1,2
Q.4(a)	What is Differential amplifier? Define Common mode gain, Difference mode gain and CMRR with expressions.	[5] 4	1,2
Q.4(b)	Explain different types of power amplifiers? Draw the circuit of Push-Pull Class B power amplifier and explain its working.	[5] 4	1,4
Q.5(a)	Derive the expression for determining the overall gain of a negative feedback system. Describe various types of feedbacks with their basic configuration. A negative feedback of $B = 2.5 \times 10^{-3}$ is applied to an amplifier of open loop gain 1000. Calculate the change in overall gain of the feedback amplifier if the gain of the internal amplifier is reduced by 20%.	[5] 5	2,6
Q.5(b)	Define Barkhausen criteria for sustained oscillation. Explain the working of the RC phase shift oscillator with suitable diagram. Justify how Barkhausen criteria is achieved in it.	[5] 5	2

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