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

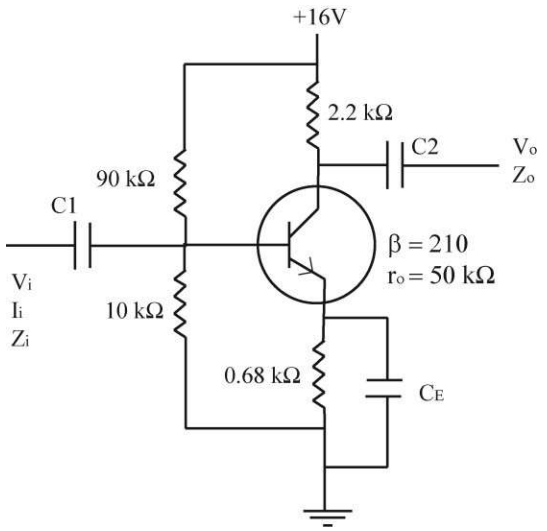
CLASS: IM.Sc / M.Sc **SEMESTER : VIII/ II**
BRANCH: PHYSICS **SESSION : SP/2025**

SUBJECT: PH410: ELECTRONIC DEVICES & 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.

			CO	BL
Q.1(a)	Describe construction, working and I-V characteristics of a solar cell?	[5]	1	1
Q.1(b)	Derive the expression for the maximum output power of the solar cell?	[5]	1	3
Q.2(a)	Write a short note on process of crystal growth and wafer preparation?	[5]	2	1
Q.2(b)	Explain the process of Optical lithography and its limitations?	[5]	2	1
Q.3(a)	For the network below determine (a) r_e (b) Z_i (c) Z_o (d) A_V and (e) A_i	[5]	3	3



Q.3(b)	Mathematically establish relation between gain-bandwidth product for network with feedback factor ▫ and without feedback?	[5]	3	2
Q.4(a)	Derive an expression for the frequency response of the Op-amp and discuss the method of dominant-pole compensation?	[5]	4	2
Q.4(b)	For an emitter coupled differential amplifier, show that common-mode rejection ratio (CMRR) can be expressed as $h_{fe} \cdot \frac{R_E}{h_{ie}}$.	[5]	4	3
Q.5(a)	Derive an expression for Op-amp based ideal differentiator and discuss its limitations.	[5]	5	2
Q.5(b)	Explain the construction of a 555 timer circuit and its application as astable multivibrator?	[5]	5	2

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