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

CLASS: IMSc/ MSc   SEMESTER : VIII/II
BRANCH: PHYSICS   SESSION : SP/2024

SUBJECT: PH410 ELECTRONIC DEVICES AND 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 characteristics of a solar cell?	[5]	1	2
Q.1(b)	Derive the I-V characteristics of a solar cell and the expression for maximum output power?	[5]	1	3
Q.2(a)	Explain the process of Optical lithography and its limitations?	[5]	2	1
Q.2(b)	For the network below determine (a) r_e (b) Z_i (c) Z_o (d) A_v and (e) A_i	[5]	3	5
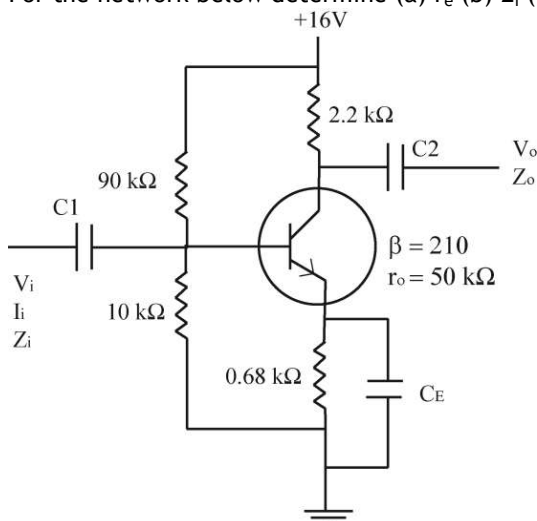
Q.3(a)	For a voltage-series feedback network, derive expression for input and out resistance?	[5]	3	3
Q.3(b)	Mathematically establish relation between gain-bandwidth product for network with feedback factor ▫ and without feedback?	[5]	3	3
Q.4(a)	Derive an expression for the frequency response of the Op-amp and explain -3 db roll-off frequency?	[5]	4	3
Q.4(b)	For an emitter coupled differential amplifier, show that common-mode rejection ratio (CMRR) can be expressed as $h_{fe} \cdot \dfrac{R_E}{h_{ie}}$.	[5]	4	3
Q.5(a)	Describe the frequency response of an ideal differentiator? How the limitation of an ideal differentiator can be overcome in a practical differentiator?	[5]	5	4
Q.5(b)	Explain the construction of a 555 timer circuit and its application as astable multivibrator?	[5]	5	2

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