Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Programme Name : BTech ECE **Semester : 7**

Course Name : Nano-Electronics Devices **Time : 03 hrs**

Course Code : ECEG4062P_3 **Max. Marks: 100**

Nos. of page(s) : 2

Instructions: Use of scientific calculators is allowed

Q -11 is Compulsory; students can choose any one option in Q-10. In Q-9 Student can choose any one option

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Define contact, proximity, and projection printing in lithography.	**4**	**CO1**
Q 2	Explain the fabrication of a membrane pump using suitable diagrams.	**4**	**CO1**
Q 3	Explain flip-chip bonding process.	**4**	**CO2**
Q 4	Describe the lift-off process in the context of photo-lithography.	**4**	**CO1**
Q 5	Define resolution in photolithography. Calculate the resolution for the given values (i) NA=0.70, λ=360nm (ii) NA=0.40, λ=280 nm	**4**	**CO2**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Describe the working of Scanning Tunneling Microscope using suitable diagrams.	**10**	**CO3**
Q 7	Explain sputtering process for thin film deposition.	**10**	**CO1**
Q8	Explain the working of rotary micro pump with suitable diagrams.	**10**	**CO2**
Q 9	Compare any two micro-mixing techniques using suitable examples. OR Describe plume mixing and laminating mixers.	**10**	**CO2**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	a) Discuss the Chemical Vapor Deposition (CVD) process. Explain the fabrication process of any CMOS device. OR b) Explain the fabrication and working of any nanomaterial based FET.	**20**	**CO2**
Q 11	a) Explain the working of a Single Electron Transistor. b) Discuss the role of scaling in modern devices.	**20**	**CO3**