Roll Number:_____

Thapar Institute of Engineering and Technology, Patiala

School of Physics & Materials Science

MID SEMESTER EXAMINATION

B.E/B. Tech. (First Year): Semester-I (2022-23)	Course Code: UPH004 Course Name: Applied Physics
15th November, 2022	Course Coordinator: Dr. Alka Upadhyay
Time: 2 Hours, M. Marks: 25	Name Of Faculty: **MJS, SDT, ALK,DPS, PUL,RKR, SDV, DKS, MKS, RAJ**

Note: Attempt all questions in given sequence. Assume missing data, if any, suitably. Symbols have their usual meaning.

Q1	(a)	Show that the total energy of an undamped spring-mass oscillator is independent of both position and time. If the mass is pulled aside and released at t=0, plot the kinetic and potential energy as a function of time.	(2+2)
	(b)	For a damped oscillator, it is observed that the maximum displacement is reduced by 20% in comparison to the previous maximum displacement. Find the logarithmic decrement of the oscillation.	(2)
Q2	(a)	Write any four conditions for an acoustically good auditorium. State and compare Eyring's and Sabine's formulae.	(2+2)
	(b)	The reverberation times in a cinema theatre are 3 s, 2 s when it is empty and filled with the audience, respectively. What will be the reverberation time when the theatre is half filled with audience?	(2)
Q3	(a)	Explain the construction and working of a Piezoelectric oscillator to produce ultrasonic waves. Explain its advantage over Magnetostriction method.	(3+1)
	(b)	Justify that "Ultrasonic waves can be used for dispersion of fog".	(2)
Q4	(a)	Write Maxwell's equations for conducting medium. Derive wave equations for electromagnetic wave propagating in conducting medium.	(2+2)
	(b)	Calculate the curl and divergence of the following vector: $\vec{v} = -y\hat{i} + x\hat{j}$	(2+1)

End of the paper