Seat No.:		Q. Paper Code: FTC-A-024	SET	P

Fabtech Technical Campus, College of Engineering & Research, Sangola

(An Autonomous Institute)

Civil Engineering, Mechanical Engineering, Electronics & Telecommunication Engineering, Electrical Engineering

Academic Year: -2025-26, Semester-I

Applied Physics (25UGS11001)

Regular End Semester Examination Winter 2025-26 [Dec./Jan]

Class:	F. Y. B. Tech.	**Day & Date:**	Monday,12/01/2026
Duration:	03 Hrs.	**Max. Marks:**	60 Marks
Time:	10:00 AM TO 1:00 PM		

Instructions:

1) Q. No. 1 is compulsory. It should be solved in the first 30 minutes in the Page No.3 of answersheet.
2) Don't forget to mention the question paper set (P/Q/R) on the top of the page 3 of answersheet.

Q. 1	Multiple Choice Questions (MCQs) Each question carries 1 mark	Marks: 10 CO	BL
1	The persistence of audible sound after the source has stopped to emit sound is known as (a) Echo (b) Reverberation (c) Reflection (d) Reverberation time	1	1
2	According to sabine reverberation time is directly proportional to (a) Volume (b) Surface area (c) Absorption coefficient (d) All the above	1	1
3	To find the depth of sea by SONAR technique waves are used (a) Light (b) Infrasonic (c) Ultrasonic (d) All of these	2	1
4	The rod used in magnetostriction method for the production of ultrasonic waves is made up of (a) Nickel (b) Copper (c) Aluminium (d) Nichrome	2	1
5	The substances that rotate the plane of polarization are said to be (a) optically active (b) optically inactive (c) opaque (d) Polaroid	3	1
6	The specific rotation of a substance is _____concentration of solution (a) independent of (b) directly proportional to (c) inversely proportional to (d) proportional	3	1
7	What is the principle behind the working of a GM counter? a)Ionization of gas due to radiation b) Emission of photons c) Reflection of electrons d) Radioactive decay	4	1
8	Which of the following is a key feature of the de Broglie hypothesis? a) Matter does not exhibit wave-like properties b) The wavelength of a particle is inversely proportional to its momentum c) Electrons can only exhibit particle-like behavior d) Waves cannot be quantized	4	1
9	What is the purpose of ball milling in nanomaterial synthesis? a) To create a high-energy environment to facilitate chemical reactions b) To break down larger particles into nanoscale size c) To deposit thin films onto substrates d) To heat nanoparticles to high temperatures	5	1

10	Which of the following is an example of a "top-down" method for producing nanomaterials? a) Chemical vapor deposition b) Lithography c) Chemical reduction d) Sol-gel process	5	1

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4) Make suitable assumptions if necessary and state it clearly.
5) Use of non-programmable calculator is allowed.

Q. No.	Questions	Marks	CO	BL
Q. 2	**Attempt any two of the following**	**10**		
1	Explain Sabine's Formula with given terms :Reverberation time, Absorption coefficient, Total absorption	**5**	1	2
2	Define: Acoustics The volume of cinema hall is given to be 100m×60m×20 m and the total acoustic absorption in it is 6800 metric Sabine. Determine reverberation time in cinema hall.	**5**	1	3
3	Identify and elaborate on factors that influence the acoustic properties of a building's design.	**5**	1	2
Q. 3	**Attempt any two of the following**	**10**		
1	Explain the principles of production methods of USW with the help of diagram.	**5**	2	2
2	List and briefly explain types of defects that can be detected using NDT methods.	**5**	2	2
3	Explain Principle behind Piezoelectric oscillator. Calculate the thickness of quartz plate which is used to produce ultrasonic waves of 5 MHz. Density of quartz is 2.65 gm/cm^3 and Young's modulus is 8×10^{10} N/m^2	**5**	2	3
Q. 4	**Attempt any two of the following**	**10**		
1	Define : Polarized light ,Unpolarized light, Brewsters angle, Polarization with the help of diagram	**5**	3	2
2	Derive an expression for the optical path difference for the reflected rays in a thin film of constant thickness and hence find the conditions for maxima and minima.	**5**	3	3
3	What are the applications of Newton's ring?	**5**	3	2

Q. 5	**Attempt any two of the following**	**10**		
1	Explain construction and working of GM Counter with related terms.	**5**	4	2
2	Explain Heisenberg's uncertainty principle with application.	**5**	4	2
3	Derive Schrodinger's time dependent wave equation	**5**	4	2
Q. 6	**Attempt any two of the following**	**10**		
1	Describe the Spray Pyrolysis method used for the synthesis of nanoparticles.	**5**	5	2
2	Explain in detail Top-Down & Bottom –Up Approach.	**5**	5	2
3	Discuss the applications of nanotechnology.	**5**	5	2

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Q. 1	Multiple Choice Questions (MCQs) Each question carries 1 mark	Marks: 10 CO	BL
1	The specific rotation of a substance is _____concentration of solution (a) independent of (b) directly proportional to (c) inversely proportional to (d) proportional	3	1
2	What is the principle behind the working of a GM counter? a)Ionization of gas due to radiation b) Emission of photons c) Reflection of electrons d) Radioactive decay	4	1
3	Which of the following is a key feature of the de Broglie hypothesis? a) Matter does not exhibit wave-like properties b) The wavelength of a particle is inversely proportional to its momentum c) Electrons can only exhibit particle-like behavior d) Waves cannot be quantized	4	1
4	What is the purpose of ball milling in nanomaterial synthesis? a) To create a high-energy environment to facilitate chemical reactions b) To break down larger particles into nanoscale size c) To deposit thin films onto substrates d) To heat nanoparticles to high temperatures	5	1
5	Which of the following is an example of a "top-down" method for producing nanomaterials? a) Chemical vapor deposition b) Lithography c) Chemical reduction d) Sol-gel process	5	1
6	The persistence of audible sound after the source has stopped to emit sound is known as (a) Echo (b) Reverberation (c) Reflection (d) Reverberation time	1	1
7	According to sabine reverberation time is directly proportional to (a) Volume (b) Surface area (c) Absorption coefficient (d) All the above	1	1
8	To find the depth of sea by SONAR technique waves are used (a) Light (b) Infrasonic (c) Ultrasonic (d) All of these	2	1
9	The rod used in magnetostriction method for the production of ultrasonic waves is made up of (a) Nickel (b) Copper (c) Aluminium (d) Nichrome	2	1

10	The substances that rotate the plane of polarization are said to be (a) optically active (b) optically inactive (c) opaque (d) Polaroid	3	1

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1	Explain Sabine's Formula with given terms :Reverberation time,Absorption coefficient ,Total absorption	**5**	1	2
2	Define: Acoustics The volume of cinema hall is given to be 100m×60m×20 m and the total acoustic absorption in it is 6800 metric Sabine. Determine reverberation time in cinema hall.	**5**	1	3
3	Identify and elaborate on factors that influence the acoustic properties of a building's design.	**5**	1	2
Q. 3	**Attempt any two of the following**	**10**		
1	Explain the principles of production methods of USW with the help of diagram.	**5**	2	2
2	List and briefly explain types of defects that can be detected using NDT methods.	**5**	2	2
3	Explain Principle behind Piezoelectric oscillator. Calculate the thickness of quartz plate which is used to produce ultrasonic waves of 5 MHz. Density of quartz is 2.65 gm/cm^3 and Young's modulus is 8×10^{10} N/m^2	**5**	2	3
Q. 4	**Attempt any two of the following**	**10**		
1	Define : Polarized light ,Unpolarized light, Brewsters angle, Polarization with the help of diagram	**5**	3	2
2	Derive an expression for the optical path difference for the reflected rays in a thin film of constant thickness and hence find the conditions for maxima and minima.	**5**	3	3
3	What are the applications of Newton's ring?	**5**	3	2

Q. 5	**Attempt any two of the following**	**10**		
1	Explain construction and working of GM Counter with related terms.	**5**	4	2
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3	Derive Schrodinger's time dependent wave equation	**5**	4	2
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1	Describe the Spray Pyrolysis method used for the synthesis of nanoparticles.	**5**	5	2
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