

USN

Course Code 1 B P H Y C 2 0 2

Second Semester B.E. Degree Examinations, July 2026

PHYSICS FOR CIVIL ENGINEERING STREAM

(Civil Engineering)

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE Full Question from each Module
 2. Formula Handbook is permitted
 3. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PO)</u>
<u>Module-1</u>			
1. a.	Derive an expression for equivalent spring constant in series & parallel combination.	08	(1 :1: 1.1.1)
b.	Explain types of damping with graphical approach.	08	(2 :1: 1.1.1)
c.	A mass of 0.5 kg causes an extension of 0.03 m in a spring and the system is set into oscillations. Find the force constant of the spring and time period of resulting oscillations.	04	(3 :1: 1.1.1)
(OR)			
2. a.	Explain the engineering applications of damped oscillations.	08	(2 :1: 1.1.1)
b.	Explain types of springs and their applications.	08	(2 :1: 1.1.1)
c.	A mass of 4.3 kg is attached to a spring of force constant 17 N/m. the mass spring system is executing SHM. Find the time period and frequency of the external force which excites resonance in the system.	04	(3 :1: 1.2.1)
<u>Module-2</u>			
3. a.	Explain wave propagation in beams, rods and slabs.	08	(1 :2: 1.1.1)
b.	Explain adverse effects and risk reduction measures of tsunami.	08	(2 :2: 1.1.1)
c.	Explain the general characteristics of tsunami.	04	(3 :2: 1.2.1)
(OR)			
4. a.	Explain engineering structures to withstand tsunami.	08	(2 :2: 1.1.1)
b.	Explain seismometer seismograph and accelerometer.	08	(2 :2: 1.1.1)
c.	Explain Richter scale of measurement.	04	(3 :2: 1.2.1)
<u>Module-3</u>			
5. a.	Explain absorption power and absorption coefficient.	08	(2 :3: 1.1.1)
b.	Derive Sabine's formula.	08	(2 :3: 1.1.1)
c.	For an empty assembly hall of size $20 \times 15 \times 10$ cubic meters with absorption coefficient 0.106. Calculate reverberation time.	04	(3 :3: 1.2.1)

(OR)

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| 6. | a. | Explain the impact of noise in multi storied building. | 08 | (2 :3: 1.1.1) |
| | b. | Explain relation between luminance and radiant quantities. | 08 | (2 :3: 1.1.1) |
| | c. | The volume of an auditorium is 12000 m ³ . Its reverberation time is 1.5 second. If the average absorption coefficient of interior surfaces is 0.4 Sabine m ⁻² . Find the area of interior surfaces. | 04 | (3 :3: 1.2.1) |

Module-4

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| 7. | a. | Explain need for inspection and benefits of NDT. | 05 | (2 :4: 1.1.1) |
| | b. | Explain eddy present testing. | 05 | (2 :4: 1.1.1) |
| | c. | Describe an experiment to determine Fermi energy of copper using an experiment. | 10 | (2 :5: 1.2.1) |

(OR)

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| 8. | a. | Explain ultrasonic testing. | 05 | (2 :4: 1.1.1) |
| | b. | Explain visual inspection. | 05 | (2 :4: 1.1.1) |
| | c. | Describe an experiment to determination of resonant frequency and quality factor using LCR series & parallel circuits. | 10 | (2 :5: 1.2.1) |

Module-5

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| 9. | a. | Explain types of smart materials. | 05 | (2 :4: 1.1.1) |
| | b. | Explain classification of sensors. | 05 | (2 :4: 1.1.1) |
| | c. | Describe an experiment to determination of Young's Modulus by single cantilever. | 10 | (2 :5: 1.2.1) |

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| 10. | a. | Explain piezo, magnetostrictive materials. | 05 | (2 :4: 1.1.1) |
| | b. | Explain basic concept of structural health monitoring. | 05 | (2 :4: 1.1.1) |
| | c. | Describe an experiment to determine magnetic field intensity by circular coil carrying a current by deflection method. | 10 | (2 :5: 1.2.1) |

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