

Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
 (Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Second Semester B.E. Degree Examinations, Sept/Oct 2023
PHYSICS FOR CIVIL STREAM

Duration: 3 hrs

Max. Marks: 100

*Note: 1. Answer any **FIVE** full questions, choosing **ONE** full question from each module.*

*2. Physical constants: Velocity of light (c) = 3×10^8 m/s ; Plank's constant (h) = 6.63×10^{-34} J-S ; Mass of the electron (m) = 9.11×10^{-31} Kg ; Boltzmann constant (k) = 1.38×10^{-23} J/K ; Avagadro number (N_A) = 6.02×10^{26} /K mole
 Charge of the electron (e) = 1.603×10^{-19} C. Missing data, if any, may be suitably assumed*

Q. No	Question	Marks	(RBTL:CO: PI)
<u>MODULE – 1</u>			
1.	a) Define SHM, Derive the expression for Differential equation for SHM	08	(1 :1: 1.1.1)
	b) Derive the expression for spring constant in series & parallel combination.	08	(2 :1: 1.1.1)
	c) A mass of 0.5Kg hang from a spring, if the mass is pulled down and let go it execute SHM, calculate the time period if the same spring is 16Cm by 0.4Kgmass	04	(3 :1: 1.2.1)
OR			
2.	a) Explain theory of damped oscillation and explain its graphical approach	08	(2 :1: 1.1.1)
	b) Describe the construction & working of Reddy's shock tube with neat diagram	08	(2 :1: 1.1.1)
	c) A bullet is moving with a speed of 1800 Km/hour, Determine the Mach number and identify the type of flow	04	(3 :1: 1.2.1)
<u>MODULE – 2</u>			
3.	a) Derive the relation between Y , η and σ .	08	(2 :2: 1.1.1)
	b) Define bending moment, and hence derive the expression for bending moment in terms of moment of inertia	08	(1 :2: 1.1.1)
	c) Calculate extension produced in a wire of length 2m and radius 0.013×10^{-2} m due to a force of 14.7N applied along its length, Given young's modulus of the material of the wire $Y = 2.1 \times 10^{11}$ N/m ² .	04	(3 :2: 1.2.1)
OR			
4.	a) What is cantilever and hence derive the expression for young's modulus by single cantilever	08	(2 :2: 1.1.1)
	b) Explain the failures of Engineering materials	08	(2 :2: 1.1.1)
	c) Calculate the Poisson's ratio of steel given its young's modulus $= 2 \times 10^{11}$ N/m ² and rigidity modulus $= 8.3 \times 10^{11}$ N/m ²	04	(3 :2: 1.2.1)
<u>MODULE – 3</u>			
5.	a) Derive the expression for energy density in terms of Einstein co-efficient	08	(2 :3: 1.1.1)
	b) Derive the expression for numerical aperture & acceptance angle	08	(2 :3: 1.1.1)

- c) The ratio of population of two energy level is 1.059×10^{-30} , find the wavelength of light emitted by spontaneous emission at 330K 04 (3 :3: 1.2.1)

OR

6. a) Describe the construction & working of semiconductor laser with energy level diagram 08 (2 :3: 1.1.1)
 b) What are fiber losses? Derive the expression for attenuation co-efficient 08 (2 :3: 1.1.1)
 c) The angle of acceptance of an optical fiber is 30° when kept in air. Find the angle of acceptance when kept in a medium of refractive index 1.33 04 (3 :3: 1.2.1)

MODULE – 4

7. a) Explain the causes & characteristics of Tsunami. 05 (2 :4: 1.1.1)
 b) Explain the causes Land slide. 05 (2 :4: 1.1.1)
 c) Define Resonant frequency & Explain the determination of Resonant frequency and Quality factor using LCR series & parallel circuits. 10 (2 :5: 1.2.1)

OR

8. a) Explain the forest fires & detection using remote sensing. 05 (2 :4: 1.1.1)
 b) Explain fire Hazards & fire protections. 05 (2 :4: 1.1.1)
 c) Define Fermi energy & Explain the determination of Fermi energy of copper using an experiment 10 (2 :5: 1.2.1)

MODULE – 5

9. a) What are the types of acoustics? Explain. 05 (1 :4: 1.1.1)
 b) Derive the expression for Sabine's formula. 05 (2 :4: 1.1.1)
 c) Define torsion pendulum & Explain the determination of moment of inertia by torsion pendulum 10 (2 :5: 1.2.1)

OR

10. a) Derive the relation between Luminescence & Radiant quantities 05 (2 :4: 1.1.1)
 b) Explain reflectance & transmittance 05 (2 :4: 1.1.1)
 c) Define young's modulus & Explain the determination of young's modulus by single cantilever 10 (2 :5: 1.2.1)

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