LIBRARY BANGALORE-49

EAST POINT COLLEGE OF ENGINEERING & TECHNOLOGY
An Autonomous Institution Affiliated to Visvesvaraya Technological University (VTU) Belagavi

USN | | | | | | | | | | |

EPPHC202

Second Semester B.E. Degree Examination, May 2026
APPLIED PHYSICS FOR CIVIL ENGINEERING

TIME:3 hrs. Max.Marks:100

Note: 1. Answer any FIVE full questions, choosing ONE question from each MODULE
2. Formula Hand Books Permitted
3. M: Marks, L: Bloom's level, C: Course outcomes.

		Module-1	M	L	C
Q.1	a	Discuss the theory of forced vibrations and hence obtain the expression for amplitude and the phase of oscillation	8	L2	CO1
	b	What are shock waves? With a neat diagram explain the construction and working of Reddy shock tube.	7	L2	CO1
	c	If a spring is oscillating with the period of 0.1 s when loaded vertically by a mass of 200 g in a frictionless medium, calculate its spring constant.	5	L3	CO1
		OR			
Q.2	a	Give the theory of damped oscillations. Discuss over damping, critical damping and under damping cases using graph.	8	L2	CO1
	b	Derive an expression for the equivalent spring constant for the series and parallel combinations of springs.	7	L2	CO1
	c	In a Reddy tube experiment it was found that, the time taken to travel between the two sensors is 195 μs. If the distance between the two sensors is 100 mm, find the Mach number. Speed of sound in air = 340m/s	5	L3	CO1
		Module–2			
Q.3	a	Define Hookes law. Derive the relation between Young's modulus (Y), bulk modulus (K), and Poisson's ratio (σ).	9	L2	CO1
	b	Define Poisson's ratio. Discuss its limiting values.	6	L2	CO1
	c	Calculate the force required to produce an extension of 1mm in steel wire of length 2 m and diameter 1 mm, if the Young's modulus is 2×10^{11} Nm^{-2}.	5	L3	CO1
		OR			
Q.4	a	Derive the expression for bending moment of a beam in terms of moment of inertia.	8	L2	CO1
	b	Explain the different modes of failure in engineering materials with examples.	7	L2	CO1
	c	A brass bar of length 1m, area of cross section 0.01 m^2 is clamped horizontally at one end. A weight of 1kg is applied at the other end. What is the depression produced (Young's' modulus is 9.78×10^{10} Nm^2	5	L3	CO1
		Module–3			
Q.5	a	Discuss the factors affecting acoustics of buildings and remedial measures.	9	L2	CO2
	b	State and explain Lambert's cosine law and the inverse square law.	6	L2	CO2

PROOF

	c	A Lambertian surface has a luminous intensity of 80 cd in the normal direction ($\theta = 0°$). Using Lambert's cosine law, determine the luminous intensity at an angle of 45°. Also, find what fraction of the normal intensity this represents.	5	L3	CO2
		OR			
Q.6	a	Define Photometry and explain photometric quantities.	9	L2	CO2
	b	Discuss the measurement of absorption coefficient of absorbing materials using Sabine's formula.	6	L2	CO2
	c	An auditorium has a volume of 15,000 m^3 and a reverberation time of 1.8 seconds. If the average absorption coefficient of its interior surfaces is 0.35 Sabine m^{-2}, calculate the total area of the interior surfaces.	5	L3	CO2
		Module–4			
Q.7	a	Describe the construction and working of a semiconductor diode laser.	8	L2	CO3
	b	Explain the applications of optical fiber in displacement sensors and temperature sensors.	7	L2	CO3
	c	The angle of acceptance of an optical fiber is 30° when kept in air. Find the angle of acceptance when it is in a medium of refractive index 1.33.	5	L3	CO3
		OR			
Q.8	a	Define acceptance angle. Derive an expression for numerical aperture of an optical fiber.	8	L2	CO3
	b	Discuss the application of lasers in laser range finder.	7	L2	CO3
	c	The ratio of population of two energy levels is 1.095×10^{-29}. Find the wavelength of light emitted at 27 °C .	5	L3	CO3
		Module–5			
Q.9	a	What is Richter scale? Discuss the classification of earthquakes.	8	L2	CO4
	b	Discuss the various fire hazards, methods of fire protection.	7	L2	CO4
	c	The intensity of one earthquake is 100 times the intensity of another earthquake. If the magnitude of the first earthquake is 6.5, estimate the magnitude of the second earthquake using the Richter scale.	5	L3	CO4
		OR			
Q.10	a	Describe the causes for landslides and engineering solutions for landslides.	8	L2	CO4
	b	Discuss the engineering structures to withstand earthquakes and tsunami waves.	7	L2	CO4
	c	Calculate the Bandwidth and quality factor of a series LCR circuit. If f_1=3800Hz, f_2=6300Hz and f_r=4500Hz.	5	L3	CO4

*****

REVISED