



CBCS SCHEME

BPHYC102/202

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2024
Applied Physics for Civil Engineering Stream

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU formula Hand book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Define SHM. Derive the expressions for equivalent force constant for two springs in series combination.	7	L2	CO1
	b.	What are damped oscillations? Give the theory of damped vibrations? Discuss the case of underdamping.	8	L2	CO1
	c.	Calculate the resonance frequency for a simple pendulum of length 1m.	5	L3	CO5
OR					
Q.2	a.	Explain the construction and working of Reddy shock tube with the help of neat sketch.	7	L2	CO1
	b.	Explain various forces acting on a system under forced vibration and discuss the three cases.	8	L2	CO1
	c.	An object travels a distance of 2km in 4s. Given the speed of sound in air 340m/s. Calculate the Mach No.	5	L3	CO1
Module – 2					
Q.3	a.	Discuss the brittle and ductile fractures.	6	L2	CO1
	b.	Define bending moment and derive an expression for bending moment with the help of neat sketch.	9	L2	CO1
	c.	Calculate the extension produced in a wire of length 2m and radius 0.013×10^{-2} m due to a force of 14.7 Newton applied along its length. Given, Young's modulus of the material of the wire, $Y = 2.1 \times 10^{11}$ N/m ² .	5	L3	CO5
OR					
Q.4	a.	Define a beam and classify the types of beams.	6	L2	CO1
	b.	Definition, a brief discussion on factors affecting fatigue such as surface effect, design effect and environmental effects.	9	L2	CO1
	c.	Calculate the force required to produce an extension of 1mm in steel wire of length 2m and diameter 1mm. ($Y = 2X, 10^{11}$ N/m ²).	5	L3	CO5

Module – 3

Q.5	a.	Define photometry and explain photometric quantities.	10	L2	CO2
	b.	Elucidate the impact of noise in multi-storied buildings.	5	L2	CO2
	c.	For an empty assembly hall of size $20 \times 15 \times 10$ cubic meter with absorption coefficient 0.106. Calculate reverberation time.	5	L3	CO2

OR

Q.6	a.	Define reverberation and reverberation time and hence derive sabines formula.	10	L2	CO2
	b.	Mention the conditions for good acoustics.	5	L2	CO2
	c.	Define the five spectral quantities.	5	L3	CO2

Module – 4

Q.7	a.	Discuss the interaction of radiation with matter and hence explain laser action.	8	L2	CO3
	b.	Explain propagation of light through optical fiber and hence derive an expression for numerical aperture and angle of acceptance.	7	L2	CO3
	c.	Calculate the numerical aperture and acceptance angle for an optical fiber of RI of core 1.5 and RI of cladding 1.48 placed in water of RI 1.33.	5	L3	CO5

OR

Q.8	a.	Enumerate the requisites of a laser system and describe the construction and working of semiconductor laser with a neat sketch and energy level diagram.	9	L2	CO3
	b.	Define attenuation in fiber with the expression for attenuation coefficient and describe the various fiber losses.	6	L2	CO3
	c.	Calculate the number of photons emitted per second for a laser with power output 10mW, given the wave length of fiber 690 nanometer.	5	L3	CO5

Module – 5

Q.9	a.	Discuss the classification of earthquakes.	9	L2	CO4
	b.	Enumerate the causes and adverse effect of Tsunami waves.	6	L2	CO4
	c.	Calculate the intensity of earthquake of magnitude 6.5 assuming the base intensity as I_0 .	5	L3	CO4

OR

Q.10	a.	Discuss the landslides and describe the causes for landslides.	8	L2	CO4
	b.	Discuss the engineering structures to withstand earthquakes and Tsunami waves.	7	L2	CO4
	c.	The intensity of one earthquake is 100 times the intensity of the other. If the magnitude of the first earthquake is 8.9, estimate the magnitude of the other.	5	L3	CO4
