CBCS SCHEME

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BPHYC102/202

First/Second Semester B.E./B.Tech. Degree Examination, June/July2024
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 × 15 × 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_o.	**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**

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