

Model Question Paper-II with effect from 2022-23 (CBCS Scheme)

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First/Second Semester B.E. Degree Examination Applied Physics for Civil Engineering Stream

TIME: 03 Hours**Max. Marks: 100**

- Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.
 02. Draw neat sketches where ever necessary.
 03. **Constants** : Speed of Light ' c ' = 3×10^8 ms⁻¹, Boltzmann Constant ' k ' = 1.38×10^{-23} JK⁻¹,
 Planck's Constant ' h ' = 6.625×10^{-34} Js, Acceleration due to gravity ' g ' = 9.8 ms⁻²,
 Permittivity of free space ' ϵ_0 ' = 8.854×10^{-12} F m⁻¹.

Module -1			*Bloom's Taxonomy Level	Marks
Q.01	a	Define Stiffness factor of a spring and hence derive expressions for the effective spring constant of springs in series and parallel combinations.	L2	7
	b	Explain various forces acting on a system under damped oscillations, setup differential equation and assuming the solution mention the variation of amplitude with respect to time.	L2	8
	c	An object travels a distance of 1km in 2s. Given the speed of sound in air 340 ms ⁻¹ calculate the mach number.	L3	5
OR				
Q.02	a	Mention the various mach regimes and Explain the construction and working of Reddy Shock Tube with the help of neat sketch.	L2	9
	b	Define resonance and discuss the sharpness of resonance.	L2	6
	c	Evaluate the resonance frequency of a spring of force constant 2467 Nm ⁻¹ , carrying a mass of 100gm.	L3	5
Module-2				
Q.03	a	Mention the types of engineering materials and describe the failures in engineering materials.	L2	9
	b	Define a Beam and classify the types of beams.	L2	6
	c	A solid lead sphere of radius 10 meter is subjected to a normal pressure of 10 Pa acting all over the surface. Determine the change in its volume.	L3	5
OR				
Q.04	a	Describe stress hardening and stress softening.	L2	6
	b	Define Poisson's ration and derive the relation between Young's Modulus, Rigidity Modulus and Poisson's ratio.	L2	9
	c	Consider a steel wire of radius 0.13 mm and length 2m. If the wire is rigidly fixed at one and loaded at the other with a mass of 1.5 kg the extension observed is 2 mm. Calculate the Young's Modulus of the material of the wire.	L3	5
Module-3				
Q.05	a	Define Photometry and explain photometric quantities.	L2	10
	b	Elucidate the Impact of Noise in Multi-storied buildings.	L2	5
	c	For an empty assembly hall of size 20 x15 x 10 cubic meter with absorption coefficient 0.106. Calculate reverberation time.	L2	5
OR				
Q.06	a	Define reverberation and reverberation time and hence derive Sabines Formula.	L2	10
	b	Mention the conditions for good acoustics.	L2	5
	c	Define the five spectral quantities.	L2	5

Module-4				
Q.07	a	Discuss the construction and working of laser in LASER range finder and its application in defense.	L2	8
	b	Define Numerical Aperture and hence derive an expression for numerical aperture in terms of the RIs of core, cladding and the Surrounding.	L2	7
	c	Calculate the number of photons emitted per second for a LASER with power output 10mW given the wave length of fiber 690 nanometer.	L3	5
OR				
Q.08	a	Explain the construction and working of fiber optic temperature sensor.	L2	6
	b	Enumerate the requisites of a laser system and Describe the construction and working of Semiconductor Laser with a neat sketch and energy level diagram.	L2	9
	c	Calculate the attenuation coefficient for a fiber of length 2 km given the input and output optical power of the fiber 90 mW and 60 mW.	L3	5
Module-5				
Q.09	a	Discuss the classification of Earthquakes.	L2	8
	b	Enumerate the the causes and adverse effects of tsunami waves.	L2	7
	c	Calculate the intensity of earthquake of magnitude 6.5 assuming the base intensity as I_0 .	L3	5
OR				
Q.10	a	Define Landslide and describe the causes for landslides.	L2	8
	b	Discuss the Engineering structures to withstand earthquakes and Tsunami waves.	L2	7
	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.	L3	5

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Program Outcome
Q.1	(a)	L2	1	1,2
	(b)	L2	1	1,2,12
	(c)	L3	1	1,2
Q.2	(a)	L2	1	1,2
	(b)	L2	1	1,2,12
	(c)	L3	1	1,2
Q.3	(a)	L2	1	1,2,12
	(b)	L2	1	1,2
	(c)	L3	1	1,2
Q.4	(a)	L2	1	1,2
	(b)	L2	1	1,2,12
	(c)	L3	1	1,2
Q.5	(a)	L2	2	1,2,12
	(b)	L2	2	1,2,12
	(c)	L2	2	1,2,12
Q.6	(a)	L2	2	1,2,12
	(b)	L2	2	1,2,12
	(c)	L2	2	1,2,12
Q.7	(a)	L2	3	1,2
	(b)	L2	3	1,2,12
	(c)	L3	3	1,2
Q.8	(a)	L2	3	1,2
	(b)	L2	3	1,2,12
	(c)	L3	3	1,2
Q.9	(a)	L3	4	1,2,6,12
	(b)	L2	4	1,2,6,12
	(c)	L3	4	1,2
Q.10	(a)	L2	4	1,2,6,12
	(b)	L2	4	1,2,6,12
	(c)	L3	4	1,2