



ACE
Engineering College
(with a Difference in Excellence)

An AUTONOMOUS Institution



Question Paper Code:

PH103BS

ACE-R20

SEMESTER END EXAMINATION

I B. Tech- I Semester- JULY- 2021

Engineering Physics

(common to CE & ME)

Time: 3 Hours

Max. Marks: 70

H. T. No									
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Answer any five full questions from the following. All Questions carry equal marks.

M=Marks; CO=Course Outcomes; PO= Program Outcomes

Q.No	Question	M	CO	PO
1. a)	Explain the four fundamental forces of nature in terms of particles experiencing , range and strength.	8	1	1
b)	What is Newton's second law and explain its form invariance.	6	1	1
2. a)	For a cartesian position vector $Xi+Yj+Zk$; deduce cylindrical and spherical equivalent, for given $(3, \pi/3, -4)$ find the cylindrical coordinates.	8	1	1
b)	Explain the terms relaxation time and quality factor. What is the relaxation time for a perfectly simple harmonic oscillator.	6	2	1
3. a)	Deduce an expression for damped harmonic oscillator and explain the factors heavy and critical damping with an example in each.	8	2	1,2
b)	Explain longitudinal wave equation, acoustic waves and standing sound waves.	6	3	1
4. a)	Derive the differential equation of motion of waves on strings and give the general solution of the same.	8	3	1,3
b)	What is the power absorbed by an oscillator? Derive the relation for power absorbed.	6	2	1
5. a)	Explain the terms impedance matching, standing waves, eigen frequencies and acoustic waves with neat diagrams (wherever necessary).	8	3	1
b)	Derive the equation for the velocity of a longitudinal wave in a bar.	6	3	1
6. a)	For a 15000 LPI grating element, discuss Rayleigh's criterion of resolving power.	6	4	1
b)	Discuss the Fraunhofer diffraction due to a single slit and explain how central fringe width depends on the width of the slit.	8	4	1
7. a)	Differentiate between Mach-Zehnder interferometer and Michelson's interferometer.	8	4	2
b)	What is lasing action? How is it achieved and mention its use in lasers.	6	5	1,2
8. a)	Describe the pumping mechanisms used in Ruby, He-Ne, CO ₂ lasers with energy values.	8	5	1
b)	For an optical fiber of core 1.55 and cladding 1.45 refractive indices, find Numerical Aperture and acceptance angle when light is launched from air. Compare the same when launched from water with refractive index value 1.33.	6	5	1

