ACE
Engineering College
(with a Difference in Excellence)
An AUTONOMOUS Institution

Question Pape Code: | PH103BS

ACE-R20

Supplementary Examination
I B. Tech- I Semester- November 2021
Engineering Physics
(Common To CE,Mech)

Time: 3 Hours

Max. Marks: 70

H. T. No

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)	What are the different types of forces in Nature? Explain in detail.	10	1	1
b)	What is the force of gravity acting on an object at the Earth's surface? Earth's mass = 5.98×10^{24} Kg, Object's mass = 1000Kg, the radius of Earth is 6.38×10^{6}m.	4	1	1
2. a)	Derive the equations of motion in polar coordinates.	7	1	2
b)	A lift carries a weight of 150N and is moving with a uniform acceleration of 2.45m/s². Determine the Tension in the cable. (a) when the lift is moving upwards (b) when the lift is moving downwards.	7	1	1,2
3. a)	Derive the differential equation of damped harmonic system.	8	2	1
b)	Discuss the conditions for over damping and critical damping of a system subjected to damping force.	6	2	1,2
4. a)	What is an electrical harmonic oscillator? Obtain an expression for the frequency of oscillations.	8	2	1
b)	Distinguish between electrical and mechanical oscillator.	6	2	1
5.	Derive the frequency of nth mode of vibration of stretched string clamped at both the ends. Show that the ratio of all possible frequencies is integral multiples of fundamental frequency.	14	3	1,3
6. a)	Explain Newton's rings experiment with diagram and derive an expression for radius of curvature of plano-convex lens.	10	4	1
b)	In a Newton's rings experiment the diameter of 15th ring was found to be 0.59cm and that of 5th ring is 0.336cm. If the radius of curvature of lens is 100cm, find the wavelength of the light.	4	4	1
7. a)	Compare spontaneous emission and stimulated emission.	6	5	1
b)	With the help of diagram, describe the construction and working of He-Ne laser.	8	5	1
8. a)	Define acceptance angle and Numerical aperture. Derive an expression for angle of acceptance.	6	5	1
b)	Mention any four applications of optical fibers.	4	5	1
c)	An optical fiber has a core material of refractive index of 1.55 and cladding material of refractive index of 1.50. The light is launched into it in air. Calculate its numerical aperture.	4	5	1