Code No. 20PH1BS02

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TEEGALA KRISHNA REDDY ENGINEERING COLLEGE
(UGC – AUTONOMOUS)
B TECH I Semester Examinations, July 2021
(CIVIL ENGINEERING)
ENGINEERING PHYSICS
Answer any Five questions
All questions carry equal marks

Time : 3 Hours   **Max. Marks : 75**

1. Deducean equation for acceleration of a body in terms of cylindrical co-ordinate system. Explain it with neat sketch.   **[15]**

2. A damped oscillator is subjected to a damping force proportional to its velocity. Set up differential equation of the oscillation. Discuss the under-damped, over-damped, and critical damped motions of the oscillator.   **[15]**

3. a) Derive an expression for frequency of vibration of a stretched string and discuss Its harmonics and overtones, with neat labeled diagram.
  b) Prove that velocity of sound in hydrogen is four times the velocity of sound in oxygen.

                                                                      [10+5]

4. a) Mention any six differences between travelling waves and standing waves.
  b) Show that for a simple harmonic oscillator, mechanical energy remains constant, and it is Proportional to the square of the amplitude.   **[6+9]**

5. a) Determine the wavelength of a monochromatic light and the resolution of spectral lines using Michelson's interferometer.
b) In a Newton's rings experiment the diameter of the 4th and 12th dark rings are 0.400 cm and 0.700 cm, respectively. Determine the diameter of 20th dark ring.   **[12+3]**

6. a) Discuss the Fraunhofer diffraction at a single slit. Obtain the condition for principal maximum and minimum.
  b) In Newton's ring experiment, why:
      (i) Central fringe is dark in reflected light?
      (ii) Fringes are circular
      (iii) The rings get closer away from centre?   **[9+6]**

7. a) Obtain an expression for acceptance angle and numerical aperture for an optical fiber.   **[10+5]**
b) Give the various advantages of optical fibers over conventional cables.

8. a) Explain the modes of vibrations of CO_2 molecule. Describe the construction and working of CO_2 laser with necessary diagrams. Mention its applications.
b) Calculate the energy and momentum of a photon of a laser beam of Wavelength 6328 A^0.   **[10+5]**

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