R18 Regulations *Subject code: 2B1AB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech I Semester Regular Examinations, April 2022

ENGINEERING PHYSICS

(Common to ME & CE)

Maximum Marks: 70 Date:02.05.2022 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1. Define vector and scalar quantities with examples.
2. State and explain the D' Alembert's principle.
3. Write about simple harmonic motion.
4. What is a damped harmonic oscillator.
5. Define sound absorption co efficient of a material and write its unit.
6. Write Sabine's relation.
7. Define the importance of Huygens principle.
8. Explain about of superposition of waves.
9. What is meant by coherence?
10. Write about the structure of an optical fibre.

Part-B

Answer All the following questions. (10M X 5=50Marks)

11. (a) Discuss the form invariance of Newton's second law. 5M
    (b) Derive the equation of motion in polar coordinates. 5M

OR

12. (a) Derive the equations of motion in cylindrical co -ordinates? 5M
    (b) What are the different types of forces? Explain in detail 5M

13. (a) What is mechanical harmonic oscillator? Obtain an expression the frequency of oscillations. 5M
    (b) Write the conditions of light, heavy, critical damping for damped harmonic oscillator? 5M

OR

14. (a) Explain in detail about electrical harmonic oscillator. 5M
    (b) Describe the power absorbed by oscillator? 5M

15. (a) Obtain the equation for the velocity of a transverse wave on a stretched string. 5M
    (b) calculate the speed of transverse waves in a wire of 1mm^2 cross-section under the tension produced by 0.1kg weight (specific gravity of material of wire =9.81 gm/cm^3 and g=9.8m/s^2) 5M

OR

16. (a)Explain the longitudinal and transverse waves with suitable equations. 5M
(b)Derive the plane acoustic equation and show that the velocity of sound wave in gas is $V = \sqrt{(\frac{\gamma P}{\rho_0})}$. 5M

17. (a) Write about the resolving power of a grating? 5M
(b)Describe the construction and working of a Michelson Interferometer? 5M

OR

18. Derive equation of Fraunhofer diffraction due to single slit. 10M

19. (a) With the help of suitable diagrams, explain the construction and working of a CO_2 laser. 5M
(b)What is a numerical aperture of a fibre? Obtain an expression for numerical aperture. 5M

OR

20. (a) Explain about signal attenuation in optical fibre. 5M
(b)With necessary theory and energy level diagram, explain the construction and working of a He – Ne gas laser. 5M