

19U303

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Name:

Reg.No:

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2020

(CBCSS - UG)

CC19U PHY3 C03 - MECHANICS, RELATIVITY, WAVES AND OSCILLATIONS

(Physics - Complementary Course)

(2019 Admission - Regular)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 0

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. What are the Galilean velocity transformation equations?
2. Define non-inertial frame of reference. Give one example.
3. What is Coriolis force?
4. What is the difference between conservative and non-conservative force? Give examples
5. Explain the conservation of linear momentum.
6. What are Lorentz transformation equations?
7. Write down the mass-energy relation and explain the symbols.
8. What is simple harmonic motion? Obtain an expression for displacement of the particle.
9. What is meant by damped oscillations? Obtain an expression for its motion.
10. What is a black body? How can it be realized practically?
11. Explain the uncertainty principle concerned with energy and time.
12. Write down the time independent schrodinger equation uncertainty relations and explain the symbols

(Ceiling: 20 Marks)

Part B (Short essay questions)

Answer *all* questions. Each question carries 5 marks.

13. What is potential energy curve? Explain potential well.

14. Two particles of masses m_1 and m_2 are separated by a distance. Show that the ratio of the distances of their center of mass is equal to the inverse ratio of their masses.
15. A rocket is 100 m long on earth. When it is in flight its length is 98 m to an observer in space lab. Compute the speed of rocket.
16. Derive an expression for plane progressive harmonic wave.
17. Show that the average kinetic energy per unit volume over a period of progressive wave is equal to half of the total energy of the wave.
18. Draw the graph between maximum KE and the frequency of incident photon for a metal surface. Determine the work function from this graph.
19. Determine the de-Broglie wavelength associated with an electron moving with a velocity $0.6c$ and rest mass 9.1×10^{-31} kg.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any *one* question. Each question carries 10 marks.

20. Define central force.
 - (a) Show that angular momentum of a particle in central force field is conserved.
 - (b) Show that the motion under central force occurs in a plane.
21. Describe Michelson-Morely experiment and explain the significance of the null results obtained.

(1 × 10 = 10 Marks)
