S. S.R. DEGREE COLLEGE, (AUTONOMOUS)
I-SEMESTER INTERNAL ASSESSMENT-I EXAMINATIONS
Course: M.Sc. PHYSICS (Paper – II)
(Classical Mechanism)
QUESTION BANK

I. Multiple Choice Questions **5 Marks**

1. The units of acceleration of gravity (g) is ( )

   a)m/s b)m^2/S^2 c) m/s^2 d)m^3/s^2

2. F=ma is Newton's _____ law ( )

   a) first b)Second c)third d) None

3. Newton's laws hold good in which frames ( )

   a)Non-inertial b)inertial c)accelerating d)None

4. Time co- ordinate of minkowski four dimensional space is ( )

   a) -ict b)ct c)ict d)it

5. X^1= x-vt, y^1=y, Z^1=z are called ( )

   a) Loentz transformations b) legrangian transformation

   c) Galilian transformation d) None

6. Constraints that can be expressed as equations involving only co - ordinates and time are called (A)

   a)Holonomic b)Non-holomic c)scleronomic d)Rheonomic

7. D Alembert's principle is equivalent to (C)

   a)Newton's first law b)Newton's second law

   c)Principle of virtual work d)Law of conservation of energy

8. The Lagrangian of a system is defined as (B)

   a)T+V b)T-V c)T/V d)TV

9. A rigid body in 3-D has degree of freedom (A)

   a)6 b)1 c)3 d)12

10. A holonomic constraint reduces (C)

    a)mass b)Time c)Degree of freedom d) momentum

11. Under galilean transformation, time (C)

    a)Depends on velocity b)is frame – dependent c)is invariant d)is complex

12. Acceleration under Galilean transformation is (C)

    a) a= a + v b)a = a- v c) a = a d) zero

13. Which force is always conservative (C)

a)Friction b)Air resistance c)Gravitational force d)Viscous force

14. Galilean transformation fails when (C)

a) Velocities are small b)Accelerations are zero

c) Velocities approach the speed of light d) Motion is one – dimensional

15. The invariant interval in minkowski space is (D)

a)Velocity b)Acceleration c) Propertime d)Space time separation

16. The world line of a free particle in minkowski space is (C)

a)Parabola b)Hyperbola c)Straight line d) Circle

17. The unit of force in SI system is (C)

a)Dyne b)Joule c)Newton d)Watt

18. Momentum transform under Galileam transformation as (B)

a)P= P b)P = P – mv c)P = P + mv d)P = mv

19. The symmetry group of minkowski space is (D)

a)Galilean group b)Rotation group c)Lorentz group d)Poincare group

20. In a non – interial frame, newton's laws (C)

a)Are invalid b)Hold without modification c)Require fictious forces d) Do not apply at all

II. Fill In The Blanks 5 X 1 = 5 Marks

1. The curve in minkowski space is called_____
2. Newton's second law in differential form is written as **F=**$\frac{mdv}{df}$
3. The frame of reference in which newton's law are voild is called an **inertial** frame
4. The equations of motion in lagrangian mechanics are obtained form the **Euler-Lagrange** equation
5. Hamilton's principle states that the action is **stationary**
6. Principle of least action is also known as **Hamilton's variational principle**
7. Central forces are always directed towards a **fixed point**
8. Newton's second law gives the definition of **force**
9. Newton's first law is also known as the **law of inerha**
10. D 'Alembert's Principle converts a dynamic problem into a problem of **state equilibrium**
11. Forces that appear only in non – interial frames are called **Pseudo** foreces
12. The force experienced due to rotation that acts radially outward is called **centrifugal** force
13. Euler's equations reduce to simple harmonic motion when the torque is **zero**
14. If the lagrangian does not depend explicity on time, the total **energy** is conserved
15. The lagrangain formulation is especially useful for systems with **Constraints**

III. Answer any two of the following questions **2 X 5 = 10 Marks**

1. Deduce Euler's equation of motion for a rigid body with a fixed point
2. State and discuss lorents transformation equation
3. Distinguish between inertial and Non – inertial frames
4. State hamilton's principle and derive Lagranian equation of motion form it
5. Deduce lagrange equation of motion from 'D' Alembert's principle
6. State 'D' Alembert's principle and write its applications