**SET –I PAPER – DSE SEM 6 FM – 80 Subject- Physics**

**Group A**

 **Answer all questions 1x20=20**

1. A rigid body is a system of particle such that the distance between any pair of particles……………………… in time.
2. Angular momentum is conserved
3. If the total torque is not zero
4. If the total torque is constant.
5. If the total torque is zero.
6. None of the above
7. A constraint is Scleronomic
8. If constraint relation depend explicitly on time.
9. If constraint relation do not explicitly depend on time.
10. If constraint relation can be made independent of velocity.
11. None.
12. Generalized coordinates of simple pendulum is given by ( symbols has their usual meaning)
13. θ b) θ, φ c)x d) r, θ
14. Euler- Lagrange differential equation is given by
15. $\frac{∂f}{∂y\_{j}}-\frac{d }{dx}\frac{∂f}{∂y\_{j}}=0$ b) $\frac{∂f}{∂y\_{j}^{. }}- \frac{d}{dx}\left(\frac{∂f}{∂y\_{j}^{.}}\right)=0$ c ) $\frac{∂f}{∂y\_{j}^{.}}- \frac{d}{dx}\left(\frac{∂f}{∂y\_{j}}\right)=0$ d)$\frac{∂f}{∂y\_{j}}- \frac{d}{dx}\left(\frac{∂f}{∂y\_{j}^{.}}\right)=0$
16. Time dilation is given by
17. $t=\frac{t\_{o}}{\sqrt{1-\left(\frac{v^{2}}{c^{2}}\right)}}$ b) $t=\frac{t\_{o}}{\sqrt{1+\left(\frac{v^{2}}{c^{2}}\right)}}$ c) $t=\frac{t\_{0}}{1-\left(\frac{v^{2}}{c^{2}}\right)}$ d) ) $t=\frac{t\_{0}}{1+\left(\frac{v^{2}}{c^{2}}\right)}$
18. Length contraction is given by
19. $L=L\_{o}\sqrt{1-\left(\frac{v^{2}}{c^{2}}\right)}$ b) $L=L\_{o}\sqrt{1+\left(\frac{v^{2}}{c^{2}}\right)}$ c) $L=L\_{o}\left(1-\frac{v^{2}}{c^{2}}\right)$ d) $L=L\_{o}\left(1+\frac{v^{2}}{c^{2}}\right)$
20. Longitudinal Doppler effect in light is given by
21. $ʋ=ʋ\_{o}\sqrt{\frac{1+\frac{v}{c}}{1-\frac{c}{v}}}$ b)$ ʋ=ʋ\_{o}\sqrt{\frac{1-\frac{v}{c}}{1+\frac{c}{v}}}$ c) $ʋ=ʋ\_{o}\sqrt{\frac{1-\frac{v}{c}}{1+c }}$ d) $ʋ=ʋ\_{o}\sqrt{\frac{1+\frac{v}{c}}{1-\frac{v}{c}}}$
22. In relativity Newton’s second law of motion is given by ……………..
23. If the object is moving its total energy is given by ………………………..
24. The fourth dimension in four dimensional space-time is given by ………..
25. The electromagnetic field vector in terms of electromagnetic scalar and vector potentials is given by…………
26. There is no variation of mass with velocity. T/F
27. The Lienard- Wiechert Potentials are scalar and vector potentials produced by a moving point charge. T/F
28. The electromagnetic energy can be radiated only if a charged particle is accelerated.T/F
29. Hamiltonian H is a function of

a) Time b) generalized momenta c) generalized coordinate d) all

 17. Phase space is represented by a space of 6N dimensions.T/F

 18. The principle of least action for conservative system is expressed as ………

 19. Central force is that force which is always directed away from or towards a fixed centre. T/F

 20. the two main features of the motion under the action of a centrtal force

 a) conservation of energy and time. B) conservation of momentum and time. C) conservation of energy and momentum d) none.

**Group B Very Short Answer 2x5=10**

21. What is meant by proper length?

22. Write down the relativistic expression for K.E of a body.

23. What is the significance of retarded potential?

24. Define the term constraints.

25. State Hamiltonian principle.

**Group C Short answer question (Word limit 150) 5x10=50**

26. How conservation laws prove to be very powerful tools in solving mechanical problems?

27. Which two important characteristics of motion are defined by rate of change of linear momentum?

28. Define degrees of freedom and how it is indicated?

29. Explain the principle of virtual work.

30. Explain inertial and non-inertial frame of reference.

31. Explain time dilation.

32. What do you mean by time like interval?

33. Explain canonical transformation.

34. Write down the physical significance of H.

35. What are the advantages of Lagrangian approach over Newtonian?