Printed Pages -02 **Roll No. : ……**

PAPER CODE –

M. Sc. Semester-I Examination, 20XX
PHYSICS
Paper No. - XXX
[Classical Mechanics]

Maximum Marks: 80

Time: Three hours **Passing Marks: 29**

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Note: *(1) Section -A is compulsory containing 10 objective type questions of 10 marks and 5 short answer type questions of 10 marks. (2) Section-B containing 8 descriptive type questions with 50% internal choice carrying 15marks for each*

Section - "A"

Q.1 Answer the following questions -- (1X10= 10) Marks

i. Write the name of Mathematicians who had developed Lagrange's equation.

ii. What is the Source of geothermal energy?

iii. Write the mathematical equation of Hamilton's principle.

iv. Which scientific principle is the basis for thermo-dilution method used in measurement of cardiac output?

v. What facts of motion can be determined by Gradient of line of velocity-time graph?

vi. What distance can be travelled by the train travelling at 20 ms^{-1} accelerates at 0.5 ms^{-2} for 30 s?

vii. Poisson bracket is related with which equation of motions?

viii. Which law stated - 'Simple harmonic motion is typified by the motion of a mass on a spring when it is subject to the linear elastic restoring force'?

ix. "F = -kx" is the expression for which law?

x. What is the length of a simple pendulum, If its time period is 2 s?

Q.2 Answer the following questions -- (2X5= 10) Marks

i. Can displacement and acceleration be in same direction in SHM? Justify your answer.

ii. What do you understand by degrees of freedom?

iii. Briefly comment on Atwood's Machine.

iv. What do you mean by Dissipative system?

v. Write the Lagranges equations from D'Alemberts principle..

Section - "B"

Attempt any four questions -- 4 x 15 = 60 Marks

Q.3. What is Variational Principle? Discuss about Calculus of variation and some techniques of calculus of variables?

Q.4. Write short notes on –
(i) Conservation of Angular momentum
(ii) Linear Harmonic oscillator,

Q.5. What do you mean by Canonical Transformation? Write some examples of Canonical Transformation and point out its advantages.

Q.6. Write a brief account of –
(i) The Angular momentum and Poisson brackets
(ii) Two dimensional Isotropic Harmonic Oscillator.

Q.7. Give a detail account of the applications of Hamilton equation of Motion as studied by you.

Q.8. Write a brief account of -
(i) Lagrange's bracket (ii) Generalized Displacement

Q.9. Give critical account of Canonical transformation and its advantages with suitable examples.

Q.10. Discuss the Phase space and the motion of the system.

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