



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)

उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.Sc. Physics (MSCPHY12)

First Year Assignment

Last Date of Submission: 15 May 2013

Course Title: Mathematical physics and
Classical mechanics

Course Code: PHY-501

Year: 2012-13

Maximum Marks: 40

Section A contains 08 short answer type questions of 5 marks each. Students are required to answer 4 questions only. Answers of short answer type questions should be 250 words approximately.

Section A

1. Show that $\frac{d^m}{dx^m} H_n(x) = 2^m \frac{n!}{(n-m)!} H_{n-m}(x)$
2. What is Fourier series and what are advantages of Fourier series?
3. Using convolution integral, find the inverse Laplace transformation of $\frac{k}{s^2(s^2+k^2)}$
4. Define tensor of second and any other order.
5. What are constrains? Define Holonomic and non-Holonomic constrains.
6. What are cyclic coordinates? Describe physical significance of Hamiltonian.
7. Evaluate $I = \int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule and a constant interval of (I) 0.02 and 0.03
8. Discuss Simpson's one third rule.

Section B contains 04 long answers type question of 10 marks each and students are required to answers 02 questions only.

Section B

1. Discuss the generating function for $J_n(x)$ Bessel's function and recurrence formula for $J_n(x)$.
2. Derive Lagrange's equation of motion from D'Alembert principle and discuss its applications.
3. What is canonical transformation? Give the condition for canonical transformation and explain with example.
4. Obtain Newton's backward difference interpolation method with example.