

# Assignment

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PHYSICS (Major)

Paper: 4.1

Full Marks : 50

Submission Date: 08/08/202

GROUP-A

**(Mathematical Method)**

( Marks : 35)

**1. Answer the following:**

**1x4=4**

- Write a second- order, second-degree differential equation.
- Mention an application of Hermite polynomial which is used in physics.
- What is meant by mean deviation?
- What is total probability?

**2. Answer the questions:**

**2x2=4**

- Check whether Frobenius method can be applied or not to the following equation:

$$2x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + (x-5)y=0$$

- What is the probability that the ace of spades will be drawn from a deck of cards at least once in 104 consecutive trials ?

**3. Answer the following:**

**5x2=10**

- Prove the following recurrence relation for Legendre polynomial  $P_n(x)$ :

$$nP_n = (2n-1)xP_{n-1} - (n-1)P_{n-2}$$

- What is Gaussian distribution?
  - Define standard deviation.

**4.** **5+2=7**

i. Show that  $\int_{-1}^{+1} P_n(x) P_m(x) dx = 0$ , where  $P_n(x)$  and  $P_m(x)$  are solutions of the Legendre differential equation.

ii. Show that,  $H_0(x)=1$

**5.** Obtain the power series solution of the Legendre equation **10**

$$(1-x^2)d^2y/dx^2 - 2xdy/dx + n(n+1)y=0$$

GROUP – B

**(Introduction to Computer and Computer programming)**

(Marks:15)

**6.** Answer the following questions: **1x2=2**

a. Define a flowchart.

b. What is computer software?

**7.** What is an operating system? Mention its function. **2**

**8.** Draw a flowchart to find the average value of three given numbers. **4**

**9.** Write the algorithm and the program in C/C++/FORTRAN to find product of two different numbers. **7**