বিদ্যাসাগর বিশ্ববিদ্যালয়
VIDYASAGAR UNIVERSITY
Question Paper

B.Sc. Honours Examinations 2022
(Under CBCS Pattern)

Semester - IV
Subject : PHYSICS
Paper : C 8 - P

Mathematical Physics - III

Full Marks : 20

Time : 3 Hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

[Experiment - 15, LNB - 02, Viva-Voce- 0 3]

Solve writing the computer programme using PYTHON language and show the output.

Answer any *one* question : 20

1. Solve the Differential Equation : $\frac{d^2y}{dt^2}+2\frac{dy}{dt}+y=0$

2. Evaluate : $\frac{1}{\sqrt{2\pi\sigma^2}}\int e^{\frac{(x-2)^2}{2\sigma^2}}(x+3)dx$ for $\sigma = 1, 0.1$.

P.T.O.

3. Generate periodic piecewise continuous functions :

$$f(x) = 0, \quad -1 \le x < 0.5$$
$$= 1, \quad -0.5 \le x < 0$$
$$= x^2, \quad 0 \le x < 1$$

4. Plot the function $f(x) = e^{-x^2}$ and also its Fourier transform.

5. (a) Show the plot of Legendre Polynomials ($P_n(x)$ for $n = 1, 2, 3, 4$ writing python programme.

   (b) Show orthogonality relation $\int_{-1}^{+1} P_m(x) P_n(x) dx = \delta_{m,n}$.
