

o important coastal resources of West

wo from the following: $5 \times 2 = 10$

the names of 5 important mangrove
n India. Give a comparative estimate of
e diversity in these regions.

descriptive account of coastal zone

re the steps involved in ecological
on?

n the priorities in coastal zone
ation.

two from the following: $10 \times 2 = 20$

a detailed description of forest
ment with respect to mangroves.

n explanatory note on role of microbes
chain.

be the importance of coastal zone
hemical cycles.

n the impact of climate change on
ion, development and succession of
ves.

705/Phs. UG/6th Sem./PHY-H-DSE-T-03/23

U.G. 6th Semester Examination - 2023

PHYSICS

[HONOURS]

Discipline Specific Elective (DSE)

Course Code : PHY-H-DSE-T-03

(Nanomaterials and Applications)

Full Marks : 40

Time : $2\frac{1}{2}$ Hours

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

1. Answer any five questions: $2 \times 5 = 10$
- i) Compare the specific surface area of cubic nanoparticles of side 50 nm and 2 nm.
 - ii) Discuss the basic difference between nanosheet and nanowire with an example.
 - iii) Define grain boundary of a nano particle.
 - iv) Distinguish between electrical band gap and optical band gap.
 - v) Explain Bottom Up synthesis of nano particles.

[Turn Over]

vi) What is the basic difference between graphyne and graphene? 10

vii) What do you mean by negative differential resistance (NDR) behavior on a system? 10

viii) Why quantum dots are referred to as artificial atoms? 10

2. Answer any two questions: 5×2=10

i) What is chemical vapor deposition (CVD)? Describe this process. 2+3

ii) Write a short note on Transmission Electron Microscopy (TEM). 5

iii) Discuss the advantages and basic principles of nanosensors. 5

iv) Discuss its effects of defects on two dimensional systems. 5

3. Answer any two questions: 10×2=20

i) a) What do you mean by Van der Waals interaction? In which ways does it differ from Coulomb interaction? Explain briefly its role in the measurement by Atomic Force Microscopy. 2+2+2

b) How electron transmission occurs in a nano system? 4

ii) Discuss briefly different properties of two dimensional nanomaterials. 10

iii) What is a transmission electron microscope (TEM)? Describe its working principle. What type of information a TEM can provide about the sample? What is the difference between Scanning Electron Microscope (SEM) and TEM? 2+4+2+2

iv) a) What do you mean by optical switches? In which ways are they advantageous compared to electrical switch? 2+2

b) Discuss briefly the advantages of CNFET compared to conventional MOSFET. 5

c) Why nanowires are used as good detectors? 1