2015

CHEMISTRY

Paper : 304

ADVANCED TOPICS IN CHEMISTRY

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following 1x4=4

(a) The *n*-type semiconductor is obtained by dopping Si with

a. B

b. Al

c. Ga

d. Sb

(b) A quantum dot is a namomaterial of dimension

e. one

f. two

g. zero

h. three

(c) Which is the application of nano optics?

a. Optical disk drives, communications and projection displays

b. Digital imaging, communications and sensors

c. Near field optical microscopy

d. All the above

(d) The high tensile strength of nano materials is due to?

a. The high density of the nanotubes

b. Efficient interlocking of the particles

c. Eash nanotube is one large molecule

d. Both a and b.

2. Answer the following questions:

(a) What is green chemistry? What is the distinction between yield and atom economy? 2

(b) Discuss the basic principles of green chemistry? 8

3. Answer the following questions:

(a) What are supramolecular devices? How they are classified? Explain with examples. 2+3+5=10

Or

What are the unique forces that are responsible for spatial organization in supramolecular chemistry and how are they different from traditional chemistry? 5+5=10

(b) What types of development occurs in the recognition of anion substrate. 3

(c) How supramolecules are thermodynamically stable. 2

(d) What are cryptands? Explain. 5

(e) Write short notes on (any three): 3x5=15

(i) Host Guest chemistry of supramolecule

(ii) Calixarenes

(iii) Recognition

(iv) Crown ethers

4. Answer the following 2x4=8

a. What is the diameter of a bucky ball? How many pentagons and hexagons are there in a bucky ball?

b. What are donors and acceptors? How deep traps affect the manufacture of semiconductors?

c. Define carbon nanotube? What are the types of carbon nanotubes?

d. What is size effect on nanomaterial? Explain briefly.

5. Answer the following questions 3x3=9

a. With a neat sketch, explain mechanical milling process for synthesis of nano particles? List advantages and disadvantages also?

b. What do you understand by Nanoribbons? Explain.

c. Discuss electrical and optical properties of nano materials.

6. Answer the following questions 5x3=15

a. What are the common enabling technologies in Nano Structure Synthesis and Assembly? Explain.

Or

Write a note on impact of nanomaterials in catalysis.

b. What are magnetic nanofluids? Mention some applications.

c. Write a note on CNT based nanosensors.

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