## 2016/ODD/07/20/BSCH-102/ BSPH-102/BSZH-102/451

### UG Odd Semester (CBCS) Exam., December—2016

B.Sc (Honours) B.Ed

(1st Semester)

Course No.: BSED-102

Full Marks: 50
Pass Marks: 20

Time: 2 hours

The figures in the margin indicate full marks for the questions

Candidates are to answer *either* BSCH-102 *or* BSPH-102 *or* BSZH-102

# CHEMISTRY (Honours)

Course No.: BSCH-102

- **1.** (a) What is diagonal relationship? Explain the reasons for this phenomena.
  - (b) Why are 4s orbitals filled before 3d orbitals? Explain on the basis of the concept of effective nuclear charge.

#### OR

**2.** (a) Outline the major postulates of Bohr's atomic model.

(2)

- (b) Derive the general formula to calculate the radii of orbits in hydrogen atom.
- **3.** (a) Differentiate between the nano- and bulk-properties of materials.
  - (b) Elaborate the sol-gel process for synthesis of nanomaterials with the help of a diagram.

#### OR

- **4.** (a) Write notes on nanotubes and nanowires.
  - (b) What do you mean by top-down approach in synthesis of nanomaterials? Explain any one type of such methods in detail. 2+4=6
- **5.** (a) Write a note on catalytic oxidation and chemical oxidation of alkanes with suitable examples.  $2\frac{1}{2}+2\frac{1}{2}=5$ 
  - (b) Explain Freund's method for preparation of cycloaklanes. 5

#### OR

**6.** (a) Write the mechanism of Friedel-Crafts alkylation reaction.

J7**/621** (*Turn Over*)

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(Continued)

5

4

6

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Identify A, B and C from the following:

$$3 \times 2 = 6$$

4

(i) 
$$+ \text{Cl-CHO} \xrightarrow{\text{AlCl}_3/\text{CuCl}} [A] + \text{HCl}$$

(ii) 
$$CH_2-CH_2 \longrightarrow HNO_2 \longrightarrow [B]$$
 $CH_2-CH \cdot NH_2 \longrightarrow -H_2O \longrightarrow [B]$ 

$$CH_2-CH \cdot NH_2 \longrightarrow -H_2O \longrightarrow [B]$$

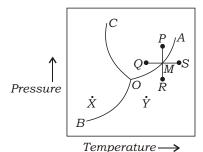
$$CH_2-CH_2 \longrightarrow CH_2-CH_2$$

$$CH_2 \longrightarrow CH_2-CH$$

$$CH_2 \longrightarrow CH_2-CH$$

$$CH_2 \longrightarrow CH_2-CH$$

- Derive Gibbs' phase rule.
  - Observe the phase diagram of water system and answer the following:



- (i) What will happen when the equilibrium at m shifts to P, Q, Rand S?
- (ii) What will happen when Y is cooled to *X* at constant pressure? 4+2=6

#### OR

- Draw the phase diagram of lead-silver system and explain its significance in desilverization of lead.
  - Write notes on the following: 4
    - (i) Polymorphism
    - (ii) Metastable equilibrium
- What are critical temperature and critical pressure? With the help of a diagram, explain the determination of above two of a gas. 2+2+2=6
  - Explain the different elements of symmetry of a crystal.

#### OR

- Elaborate the corrections **10.** (a) two introduced by van der Waals to explain the equation of state for a non-ideal gas. 6
  - Write a note on Miller indices. 4

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(Continued)

		PHYSICS		5.	(a)	What is gravitational intensity?	5
( Honours )					(b)	Calculate gravitational intensity due to	
		Course No.: BSPH-102			(~)	thin spherical shell.	5
( M	echa	nics and General Properties of Matters	)			OR	
				6.	(a)	Explain bar pendulum.	5
1.	(a)	What is Lorentz transformation equation of coordinates?	5		(b)	Find out the acceleration due to gravity with the help of bar pendulum.	5
	(b)	Explain fictions forces.	5			with the help of bar pendulum.	5
	, ,	OR		7.	(a)	Find out the relationship among elastic constants.	5
2.	(a)	Discuss the general and special theory of relativity.  What is conservative force?	5		(b)	What is torsional pendulum?	5
	(b)		5			OR	
	, ,			8.	(a)	What is viscosity of fluid?	5
3.	(a)	Explain the principle of conservation of angular momentum of a system of rotating body.	5		(b)	Find out viscosity of a liquid by Poiseuille's method.	5
	(b)	Find out the expression for velocities of two bodies after elastic collision.	5	9.	(a)	What is the importance of nanoscale and nanotechnology?	5
	OR				(b)	Explain the objective of nanotechnology.	5
4.	(a)	Explain the theorems of moment of inertia.				OR	
			5	10.	(a)	What is nanophysics?	5
	(b)	Calculate the moment of inertia of a cylinder passing through centre.	5		(b)	Write a short note on nanoparticles.	5

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(Turn Over)

(b) Enlist the salient features of class

# **ZOOLOGY** ( Honours ) Course No.: BSZH-102 ( Taxonomy and Chordates) Establish a relationship between systematics and taxonomy. What is meant by International Code of Zoological Nomenclature (ICZN)? Mention the rules of nomenclature as prescribed by ICZN. 2+4=6 OR Write a note on Linnaean hierarchy. **2.** (a) 3 Illustrate the newer trends followed in systematics for classifying organisms. 7 Classify Chordata up to class with examples. 5 Write down the primitive and specialized characters of Amphioxus. 5 OR

Give an account of the digestive system of Petromyzon. How does it differ from

Ammocoete larva?

		Cyclostomata.	4
5.	(a)	Describe the external morphological features of <i>Scoliodon</i> .	5
	(b)	Analyze the affinity exhibited by Dipnoi towards other closely related organisms.	5
		OR	
6.	(a)	Depict the functions of air bladder in fishes.	6
	(b)	Mention the characters of all the amphibian orders along with examples.	4
7.	(a)	Distinguish between poisonous and non-poisonous snakes.	5
	(b)	Enlist the salient characteristics of class Reptilia.	5
		OR	
8.	(a)	Write down the salient features of class Aves.	4
	(b)	Describe different types of air sacs present in birds with the help of labelled diagram.	6
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3+3=6

# (9)

(a)	Explain the digestive system of any mammal.	5
(b)	Demonstrate the ways or methods of parental care shown by the amphibians.	5
	OR	
(a)	Briefly outline the general characters of <i>Sphenodon</i> .	5
(b)	Write a note on affinity of Sphenodon with other related groups of animals.	5
	(b) (a)	mammal.  (b) Demonstrate the ways or methods of parental care shown by the amphibians.  OR  (a) Briefly outline the general characters of Sphenodon.  (b) Write a note on affinity of Sphenodon

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