

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

B.Sc. (Honours) B.Ed

( 3rd Semester )

Course No. : BSED-302

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-302  
*or* BSPH-302 *or* BSZH-302

CHEMISTRY

( Honours )

Course No. : BSCH-302

( General Chemistry )

1. (a) Draw the shapes of *p*-orbitals. 2  
(b) Describe Hund's rule of maximum multiplicities. 3

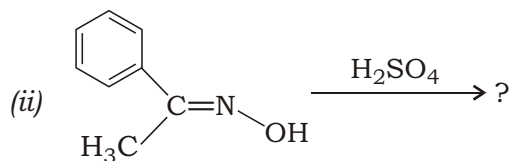
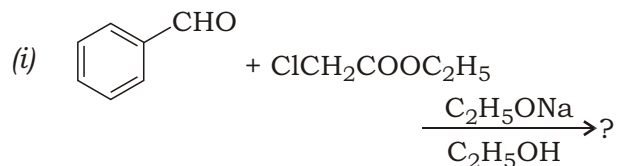
- (c) How is boric acid prepared? 2  
(d) What are carbides? Briefly describe about methanides. 1+2=3

OR

2. (a) Describe (3C—2e) and (2C—2e) bonds taking example of diborane. 4  
(b) It is impossible to have a 3*f* orbital. Why? 2  
(c) Being in the same group phosphorous can form both trihalide and pentahalide but nitrogen can only form trihalide. Why? 2  
(d) Write the electronic configuration of ferrous ion. How many unpaired electrons are present in ferrous ion? 1+1=2
3. (a) What is Tollens' reagent? Write one of its use. 2  
(b) Write the mechanism of haloform reaction. 3

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(c) Complete the following reactions :  $2\frac{1}{2}\times 2=5$



OR

4. (a) Explain why acetaldehyde is less reactive than formaldehyde and more reactive than benzaldehyde towards nucleophilic addition reaction. 3
- (b) Write a short note on Cannizzaro reaction. 3
- (c) Why is trichloroacetic acid more acidic than chloroacetic acid? 2
- (d) With the help of Grignard reagent, prepare benzoic acid. 2
5. (a) Elaborate the role of antioxidants as food additives with suitable examples. 3

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(b) Write short notes on the following :

$3\frac{1}{2}\times 2=7$

- (i) Octane number  
(ii) Knocking

OR

6. (a) Give the preparation of a dye. 4
- (b) Write short notes on the following :  $3\times 2=6$   
(i) Food preservatives  
(ii) Azo dye
7. (a) Explain intensive and extensive properties with examples.  $1\frac{1}{2}\times 2=3$
- (b) Prove that the adiabatic relation  
 $PV$  constant 3
- (c) Show that for van der Waals' gas  
 $C_p - C_v = R + \frac{2aP}{RT^2}$  4
8. (a) 6 moles of an ideal gas expands isothermally and reversibly from a volume of 1 litre to 10 litre at 27 °C. What is the maximum work done? 4

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- (b) Define Joule-Thomson coefficient and inversion temperature. 3
- (c) Describe transition state theory. 3
9. (a) What is the importance of compressibility factor ( $Z$ )? 2
- (b) Under what conditions a real gas will behave like ideal gas? 3
- (c) Derive the expression of root mean square velocity from Maxwell's distribution of molecular velocities. 5
- OR**
10. (a) State the principle of equipartition of energy. Using this principle, estimate the energy of water at room temperature. Assume that all degrees of freedom are excited and contribute towards the energy of the molecule.  $2+4=6$
- (b) What are the causes of deviation of real gas from ideal gas behaviour? 4

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PHYSICS

( Honours )

Course No. : BSPH-302

( **Physical Optics** )

1. (a) What is Lloyd's mirror? 5
- (b) Describe the method of production of interference fringes by prism. 5
- OR**
2. (a) Explain the theory of Newton's ring. 5
- (b) What is Hardinger fringe? 5
3. (a) Describe Michelson-Morley experiment. 5
- (b) Explain the formation of circular fringes. 5
- OR**
4. (a) What is Fraunhofer diffraction? 5
- (b) Explain plane diffraction grating. 5
5. (a) Explain the diffraction of light at straight edge and circular edge.  $2\frac{1}{2}\times 2=5$
- (b) Write a note on Fresnel half-period zone. 5

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( Continued )

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**OR**

6. (a) Define resolving power of lens. 5  
(b) Write down the advantages of grating spectrum over prism spectrum. 5
7. (a) What do you mean by polarization of light? 5  
(b) Describe various methods of production of polarized light. 5

**OR**

8. Write short notes on any *two* of the following : 5×2=10  
(a) Brewster's law  
(b) Double diffraction  
(c) Polaroids
9. (a) Explain the construction and working of helium-neon laser. 5  
(b) Describe the principle of optical resonator. 5

**OR**

10. Explain any *two* of the following : 5×2=10  
(a) Principle of holography  
(b) Use of optical fibre in communication  
(c) Applications of laser

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ZOOLOGY

( Honours )

Course No. : BSZH-302

**( Physiology, Biochemistry, Histology and Comparative Anatomy )**

1. (a) What is meant by nutrition? Give a brief explanation of various types of nutrition. 1+3=4  
(b) Describe the process of absorption of dietary components in small intestine of mammals. 6

**OR**

2. (a) Write a note on the respiratory organ in man. 5  
(b) Explain the mechanism of gaseous exchange that takes place during respiration. 5
3. (a) Give an account of the factors required during coagulation of blood. 5  
(b) What are the components of blood? Explain with the help of neat and labelled diagrams. 5

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**OR**

4. (a) Explain the patterns of excretion in animals. 8  
(b) Mention the major functions of vertebrate kidney. 2
5. (a) Classify carbohydrates with examples. 6  
(b) Mention the biological significance of carbohydrates. 4

**OR**

6. (a) Describe fat-soluble vitamins. 4  
(b) How does an enzyme act? 6
7. (a) Give an account of the histology of pancreas. 4  
(b) Write a note on histology of small intestine. 6

**OR**

8. (a) Give an account of various types of muscle found in vertebrates. 6  
(b) Describe the histology of bone. 4
9. (a) What are air sacs? Explain various types of air sac with the help of labelled diagrams. 2+5=7

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- (b) Mention the functions of air sacs. 3

**OR**

10. (a) Illustrate the evolution of kidney with labelled diagram. 6  
(b) Enlist the functions of integument. 4

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