2017/EVEN/07/20/BSPH/
BSCH/BSZH–401/582

UG Even Semester (CBCS) Exam., May—2017

(Honours)

(4th Semester)

Course No. : BSED–401

Full Marks : 50
Pass Marks : 20

Time : 2 hours

The figures in the margin indicate full marks for the questions

Physics students will answer BSPH–401 and Chemistry students will answer BSCH–401 and Zoology students will answer BSZH–401

PHYSICS

Course No. : BSPH–401

(Heat, Thermodynamics and Electrostatistics)

1. *(a)* Explain van der Waals gas equation and determine its critical constant. 5

(b) What do you understand by root mean square velocity? 5

OR

2. *(a)* What are the basic assumptions of kinetic theory of gases? Explain. 5

(b) Write a short note on thermoelectric thermometer. 5

3. *(a)* Describe blackbody radiation. 5

(b) Derive the expression of Stefan-Boltzmann law. 5

OR

4. *(a)* Discuss Rayleigh-Jeans law as a limiting case of Planck's law. 5

(b) Determine the thermal conductivity of solids with the help of Searle's method. 5

5. *(a)* Explain specific heat of ideal gas and prove that $C_P \quad C_V \quad R$, where letters have their usual meaning. 5

(b) What is first law of thermodynamics? Describe in brief the important applications of first law of thermodynamics. 5

OR

6. *(a)* Explain second law of thermodynamics with suitable illustration. 5

(b) State and prove Carnot theorem. 5

7. *(a)* What is Jule-Thomson effect? 5

(b) Explain Gibbs phase rule. 5

OR

8. *(a)* Define enthalpy and discuss the important properties of enthalpy. 5

(b) What is Helmholtz and Gibbs free energy? Explain in brief. 5

9. *(a)* Define electric field and dipole. 5

(b) Calculate potential energy for dipole. 5

OR

10. *(a)* Explain Poisson's equation. 5

(b) What is Gauss law? Explain it with the help of uniformly charged sphere. 5

CHEMISTRY

Course No. : BSCH–401

(Inorganic Chemistry)

1. *(a)* Write the principle of flame photometry and its application. 5

(b) Write a short note on natural and synthetic ion exchangers. 5

OR

2. *(a)* Write a short note on setting of cement. 2

(b) What are fertilizers? How is Ammonium Sulphate Phosphate (ASP) prepared? 1+2=3

(c) What are pigments? Give an example. 2+1=3

(d) What is Thenard's blue? 2

3. *(a)* What are the limitations of valence bond theory? 2

(b) What is hybridization? Predict the hybridization and structure of ammonium ion. 2+2=4

(c) Define chemical exchange energy. 2

(d) Draw the canonical structures of carbonate anion (CO_3^{2-}). 2

OR

4. *(a)* What are the basic postulates of VSEPR theory? 4

(b) The H—P—H bond angles in PH_3 are smaller than the H—N—H bond angles in NH_3. Explain. 2

(c) PCl_5 is trigonal bipyramidal whereas IF_5 has the shape of square pyramid. Explain. 4

5. *(a)* What is the energy gap in band theory? Compare the properties of conductors, semi-conductors and insulators on the basis of band theory. 2+3=5

(b) Define extrinsic and intrinsic semi-conductors. 3

(c) Compare the temperature dependence of electrical conductivity in conductors, semi-conductors and superconductors. 2

OR

6. *(a)* What are peroxides? How are peroxides classified? Write two uses of peroxides. 2+2+2=6

(b) What is Marshall's acid? Write the structure and method of preparation of Marshall's acid. 1+1+2=4

7. *(a)* What is primary and secondary valency? Explain with a suitable example. 2½+2½=5

(b) Write the IUPAC names of the following complexes : 3

(i) $[CoBr(NH_3)_5]SO_4$

(ii) $[Fe(NH_3)_6][Cr(CN)_6]$

(iii) $Na[NiCl_4]$

(c) What are interhalogen compounds? Give an example each of cationic and anionic interhalogen ions. 1+1=2

OR

8. *(a)* Explain ionization isomerism with example. 2

(b) Explain the factors which affect the solubility of coordination complexes. 4

(c) What are polyhalides and pseudo-halogens? 2

(d) Write down the molecular formula of the following coordination compounds : 2

(i) Potassium tetrachloropalladate(II)

(ii) Diamminedichloroplatinum(II)

9. *(a)* List three rules for the linear combination of atomic orbitals. 3

(b) Use the molecular orbital theory to explain why the bond strength in a N_2 molecule is greater than that in a F_2 molecule. 2

(c) Use the molecular orbital theory to predict the bond order and magnetism in CO and CO ion. 3

(d) Why does He^2 exist whereas He_2 does not? 2

OR

10. *(a)* Write a short note on ozone layer depletion. 2

(b) What is turbidity? 2

(c) Write short notes on the toxicity of Pb and As. 2+2=4

(d) Define TDS (Total Dissolved Solids). 2

ZOOLOGY

Course No. : BSZH–401

(Endocrinology, Biotechniques and Biostatistcis)

1. *(a)* Describe the structure of mammalian ear with the help of a labelled diagram. 5+2=7

(b) What are rheoreceptors? Briefly explain any one type of rheoreceptors. 1+2=3

OR

2. *(a)* Classify synapse. Explain the biochemical mechanism of synaptic transmission. 4+3=7

(b) Write notes on any *two* of the following : 1½×2=3

(i) Isotonic contraction

(ii) Isometric contraction

(iii) Tetanic contraction

(iv) Muscle fatigue

3. *(a)* Outline the structure and histology of mammalian ovary with the help of a diagram. 6

(b) Enlist the endocrine functions of ovary. 4

OR

4. *(a)* Describe the process of transportation of hormones. 5

(b) How do the hormones act on the target organs? 5

5. *(a)* What is chromatography? Briefly explain the chromatographic methods. 1+3=4

(b) Illustrate the procedure of paper chromatography. 6

OR

6. *(a)* Give an account of various fixatives used for cells/tissues/whole animals. 5

(b) Explain the methods of staining applied to the study of cellular chemistry. 5

7. *(a)* Write a note on animal cell culture. 6

(b) Mention the advantages and disadvantages of tissue culture. 4

OR

8. *(a)* Comment on cultured cells and evolution of cell lines. 5

(b) How could the cultured cell lines be maintained? 5

9. *(a)* Compute median for the following frequency distribution : 5

Class Intervals	*f*
142–148	1
135–141	2
128–134	4
121–127	8
114–120	2
107–113	2
100–106	1
	N 20

(b) What is mode? Mention its uses and demerits. 5

OR

10. *(a)* Calculate standard deviation by applying short method for the following frequency distribution : 5

Class Intervals	*f*
70–84	10
55–69	50
40–54	60
25–39	40
10–24	20
	N 180

(b) What is meant by correlation? Briefly explain any one type of correlations.

2½+2½=5

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