

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

(Honours)

(6th Semester)

Course No. : BSED-601

*Full Marks : 50**Pass Marks : 20**Time : 2 hours**The figures in the margin indicate full marks
for the questions*Chemistry students will answer BSCH-601 and
Zoology students will answer BSZH-601

CHEMISTRY

(Honours)

Course No. : BSCH-601

(Physical Chemistry)

Answer **all** questions

1. (a) Differentiate between physisorption and chemisorption. 3
- (b) List few applications of adsorption. 3
- (c) How can surface area of the adsorbent be determined using BET equation? 4

J7/1969

(Turn Over)

OR

2. (a) Define adsorption isobar and adsorption isostere. 2+2=4
- (b) What is meant by desorption activation energy? Explain how this parameter is made use in determining the time for which the atoms of an adsorbate remain on the surface of an adsorbent. 2+2=4
- (c) Write an equation for the adsorption of a solute from a solution and explain the terms involved in it. 2
3. (a) Define upper consolute temperature and lower consolute temperature. 2+2=4
- (b) List the factors influencing the solubility of a gas in a liquid. 3
- (c) What are ideal and non-ideal solutions? 1½+1½=3

OR

4. (a) Define azeotropic mixture. 2
- (b) Derive the expression for the temperature dependence of vapour pressure of a solution. 3
- (c) Describe the characteristics of phenol-water system. 5

J7/1969

(Continued)

(3)

5. (a) Derive an expression for the entropy change accompanying variation of temperature and volume of an ideal gas. 5
- (b) Define standard entropy. 2
- (c) 10 moles of an ideal gas expand reversibly from a volume of 5 dm^3 to 15 dm^3 at a temperature of 25°C . Calculate the change in entropy of the gas. 3

OR

6. (a) State the law of mass action and the law of chemical equilibrium. 2+2=4
- (b) Derive Van't Hoff equation. 6
7. (a) Define molarity and normality. 2+2=4
- (b) State Raoult's law of vapour pressure lowering. How is this law derived? Explain how this law can be used for determining molar mass of a dissolved substance. 1+3+2=6

OR

8. (a) What are isotonic solutions? 2
- (b) Explain the term molal elevation constant. 2

J7/1969

(Turn Over)

(4)

- (c) Explain the conditions under which abnormal molar masses of solutes are obtained from the measurement of colligative properties of their solutions. 3
- (d) Determine the relationship between the Van't Hoff factor i and degree of dissociation of an electrolyte. 3
9. (a) Show that for a rigid diatomic rotor, the moment of inertia, I is given by $I = r^2$. 4
- (b) What are the selection rules for vibrational spectroscopy? 2
- (c) Write short notes on chemical shift and g -factor. 2+2=4

OR

10. (a) Write a note on Born-Oppenheimer approximation. 3
- (b) Write the fundamental vibrations and symmetry of CO_2 molecule. 2
- (c) What is Franck-Condon principle? 2
- (d) Calculate the NMR frequency (in MHz) of the proton (^1H) in a magnetic field of intensity 1.4092 tesla, given that $g_N = 5.585$ and $\mu_N = 5.05 \times 10^{-27} \text{ JT}^{-1}$ 3

J7/1969

(Continued)

(5)

ZOOLOGY

(Honours)

Course No. : BSZH-601

(**Environmental Biology, Evolutionary Biology
and Toxicology**)

Answer **all** questions

1. (a) What is ecological pyramid? Exemplify various types of ecological pyramids found in the ecosystem. 1+5=6
- (b) How does the energy flow in the ecosystem? Mention the significance of food chain. 2+2=4
- OR**
2. (a) Explain the sources, effect and control of air pollution and suggest preventive measures for the same. 5
- (b) Define biogeochemical cycle. Illustrate nitrogen cycle in detail. 1+4=5
3. (a) What is meant by fossorial adaptation? Explain the modifications that took place to adapt to fossorial life. 1+4=5
- (b) Describe mimicry. Write about its significance. 5

J7/1969

(Turn Over)

(6)

OR

4. (a) Comment on adaptive radiation in Aves. 5
- (b) Write a note on volant adaptation in mammals. 5
5. (a) Analyze the concept of wetland with reference to N-E India. Mention its significance. 3+2=5
- (b) How should wetlands be managed for sustainable development? 5

OR

6. (a) Write a note on any *one* of the following : 5
- (i) Ranser convention
- (ii) Wetland loss
- (b) Describe the National Wetland Policy. 5
7. (a) Explain the morphological and embryological evidences of organic evolution. 6
- (b) Discuss the 'modern synthetic theory' of evolution. 4

OR

8. (a) Outline the phylogeny of camel. 8
- (b) Criticize Lamarckism. 2

J7/1969

(Continued)

(7)

9. (a) Define toxicology. Classify various types of toxicants. 1+4=5
- (b) Exemplify the mode of action of pesticides. 5

OR

10. (a) Describe the concept of biomonitoring. Enlist its advantages and disadvantages. 5
- (b) What is biomagnification? Discuss in detail about the process of biomagnification. 5
