UG-CS-1171 **BPHYS-31**

U.G. DEGREE EXAMINATION – FEBRUARY 2023

Physics

Third Semester

OPTICS AND SPECTROSCOPY

Time : 3 hours Maximum marks : 70

PART A — (3 × 3 = 9 marks)

Answer any THREE questions out of Five questions in 100 words

All questions carry equal marks.

1. Define a planatic lens?

2. What is interference of light?

3. What is Rayleigh's criterion?

4. Discuss about Nicol prism.

5. State Raman effect.

PART B — (3 × 7 = 21 marks)

Answer any THREE questions out of Five questions in 200 words.

All questions carry equal marks.

6. Derive the condition for dispersion without deviation in a combination of two prisms?

7. Explain with neat diagram. Write down the construction and working of Jamin's interferometers?

8. Give the comparison between Fresnel's and Fraunhofer diffraction.

9. Describe the construction and action of quarter and half wave plates?

10. Write a note on quartz spectrograph and its applications.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions out of Seven questions in 500 words

All questions carry equal marks.

11. Describe the principle, construction, working and action of a compound microscope?

12. Explain the theory, to determine the wavelength of light using Michelson's interferometer and its applications?

13. Derive an expression for angle of diffraction by plane transmission grating for normal incidence.

14. Describe the construction of Nicol prism with neat sketch. Explain the action of Nicol prism as Polariser and analyser.

15. Define nuclear magnetic resonance and explain the construction, working and applications of nuclear magnetic resonance.

16. What is an air wedge and describe the experiment to determine the thickness of a thin wire.

17. Describe the method of production and detection of circularly polarised light.

UG-CS-1172 BPHYS–32

U.G. DEGREE EXAMINATION — FEBRUARY, 2023.

Physics

Third Semester

HEAT AND THERMODYNAMICS

Time : Three hours Maximum marks : 70

PART A — ($3 \times 3 = 9$ Marks)

Answer any THREE questions out of Five questions in 100 words.

All questions carry equal marks.

1. State Seebeck effect

2. Explain lambda point.

3. Define coefficient of thermal conductivity.

4. Write a note on molecular collisions.

5. What is meant by a reversible and irreversible processes?

PART B — ($3 \times 7 = 21$ marks)

Answer any THREE questions out of Five questions in 200 words.

All questions carry equal marks.

6. Describe with neat sketch of Callendar and Griffith's bridge.

7. Define super fluidity and write down the applications of super fluidity.

8. Derive the expression for rectilinear flow of heat along a bar.

9. Define the term mean free path and derive an expression for mean free path.

10. Derive the expression for Clausius - Clapeyron equation.

PART C — ($4 \times 10 = 40$ marks)

Answer any FOUR questions out of Seven questions in 500 words. All questions carry equal marks.

11. Derive Mayer's relation for an ideal gas.

12. Explain in detail the working of refrigerator and air-conditioning machines.

13. Define Newton's law of cooling and explain the determination of specific heat capacity of liquid.

14. Explain the determination of Vander walls constant and derive the relation between Vander Wall's constant and critical constants.

15. Derive Maxwell thermo dynamical relations and explain its applications.

16. Derive an expression for viscosity, diffusion and thermal conductivity of gases.

17. Explain in detail Carnot heat engine.

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UG–CS-1191 BCHESA–31

U.G. DEGREE EXAMINATION — FEBRUARY, 2023.

Physics / Botany / Zoology

Third Semester

GENERAL CHEMISTRY – I

Time : 3 hours Maximum marks : 70

PART A — ($3 \times 3 = 9$ marks)

Answer any THREE questions out of Five.

1. Cations are smaller in size while anions are larger in size than the corresponding atoms. Why?

2. State nucleophilic substitution reaction with an example.

3. Differentiate positive and negative catalyst.

4. Mention the occurrence and deficiency diseases caused by vitamin – K.

5. How can you save ozone layer? Explain.

PART B — ($3 \times 7 = 21$ marks)

Answer any THREE questions out of Five.

6. What is ionic bond? Explain the factors affecting and formation of KCl molecule.

7. What are organic reactions? Explain how electrophiles and nucleophiles formed.

8. Discuss the general characteristics of catalyst.

9. What are carbohydrates? Discuss briefly its classification.

10. Write note on green house effect.

PART C — ($4 \times 10 = 40$ marks)

Answer any FOUR out of Seven.

11. (a) Define the term chemical bond. Mention the significance. (5)

    (b) Explain the formation of coordinate covalent bond with suitable example. (5)

12. Describe various types of reactions found in organic chemistry with examples. (10)

13. Write a, note on (a) Enzyme catalysis (b) Acid-base catalysis. (5 + 5)

14. What are monosaccharides? Explain the chemical properties of glucose. (10)

15. Discuss the effects radioactive pollution and radioactive waste disposal. (10)

16. (a) Give a short introduction on the classification of vitamins. (5)

    (b) Explain the physical and chemical properties of fructose. (5)

17. Mention the sources of water pollution. Describe its prevention and water treatment. (10)

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