**647510** **0301201C1010** **Seat No :_____**

# B.Sc. Semester - 2 (*CBCS*) Examination
## March/April - 2023 (OLD COURSE)
## PHYSICS (CORE)

**Time: 2:30 Hours** **Marks: 70**

**Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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**Q.1(A) Answer the following questions. (Any One)** **(07)**

**1.** Discuss standing waves on a string.

**2.** Explain Laplace's correction in the case of speed of sound in the gas.

**Q.1(B) Answer the following question. (Any One)** **(04)**

**1.** Derive the expression for intensity of sound.

**2.** Write the laws of transverse vibrations of a string.

**Q.1(C) Answer the following question. (Any Three)** **(03)**

**1.** Sound waves are longitudinal waves. **[True/False]**

**2.** The change in frequency of wave due to motion of source or observer is called ……

**3.** The waves which can be produced only in material medium are called inelastic waves. **[True/False]**

**4.** Define Transverse wave motion.

**5.** What is the frequency range of audible waves in Hz?

**Q.2(A) Answer the following questions. (Any One)** **(07)**

**1.** Derive the equation $I_C = \beta I_B + (\beta + 1) I_{CBO}$

**2.** Describe the types of filter circuits for rectifier.

**Q.2(B) Answer the following question. (Any One)** **(04)**

**1.** Derive an equation of ripple factor.

**2.** Discuss three configurations of transistor in short.

**Q.2(C) Answer the following question. (Any Three)** **(03)**

**1.** Which diode is used as voltage regulator?

**2.** How many P-N junction diodes are required in center tapped full wave rectifier?

**3.** Write names of transistor terminals.

**4.** In a transistor, emitter junction is always in forward biased. **[True/False]**

**5.** What is the maximum efficiency of the full wave rectifier in percentage?

**Q.3(A) Answer the following questions. (Any One)** **(07)**

**1.** Explain Young's double slit experiment.

**2.** Explain interference by reflected light.

**Q.3(B) Answer the following question. (Any One)** **(04)**

1. Explain Lloyd's single mirror in short.
2. Discuss wavefront.

**Q.3(C) Answer the following question. (Any Three)** **(03)**

1. Write the types of interferences.
2. The central region in Newton's ring is dark. **[True/False]**
3. What are the different shape of wavefront?
4. The thin films are colored due to ……
5. The velocity of light is minimum in vacuum. **[True/False]**

**Q.4(A) Answer the following questions. (Any One)** **(07)**

1. Discuss diffraction pattern of a straight edge.
2. Explain action of a zone plate.

**Q.4(B) Answer the following question. (Any One)** **(04)**

1. Compare Fresnel and Fraunhofer diffraction.
2. Mention four differences between zone plate and convex lens.

**Q.4(C) Answer the following question. (Any Three)** **(03)**

1. Lenses are used in Fresnel's diffraction. **[True/False]**
2. Give the name of different types of diffractions.
3. Zone plate behaves like a Concave lens. **[True/False]**
4. ……. is bending of the waves around the edges of an obstacle.
5. The area of half period is zone is equal to $\pi b\lambda$. **[True/False]**

**Q.5(A) Answer the following questions. (Any One)** **(07)**

1. Explain polarization by scattering.
2. Describe cardinal points of an optical system.

**Q.5(B) Answer the following question. (Any One)** **(04)**

1. State and prove Brewster's law.
2. Derive Newton's formula for co-axial lens system.

**Q.5(C) Answer the following question. (Any Three)** **(03)**

1. For which color of light angle of deviation is minimum?
2. White light is composed of …… colors.
3. A Nicol prism is …… crystal.
4. Ray optics is also known as ……optics.
5. Dispersive power $\boldsymbol{\omega}$ = ……

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