

**BANKIM SARDAR COLLEGE**

**Part – II (1+1+1) Examination 2020**

**B.Sc. (General)**

**Subject: Physics**

**Group: (1+2+3+4)**

**Time: 2 Hours**

**Full Marks: 50**

**(Answer each group in separate Answer-Sheets)**

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**Group: 1**

**(Answer in separate Answer-Sheets)**

**Answer Question 1 and any two Questions from Question 2 to 5**

1. What is an achromatic doublet? 2.5  
OR  
What is quarter wave plate? 2.5
2. Write down the difference between Fresnel and Fraunhofer diffraction. What is Zone plate? 3+2=5
3. Distinguish between prism spectrum and grating spectrum. State Brewster's law in polarization of light. 3+2=5
4. Deduce an expression for the intensity of light at a point due to superposition of waves coming from two light sources. 5
5. State Fermat's principle and establish from it Snell's law of refraction for a plane surface separating two media? 5

**Group: 2**

**(Answer in separate Answer-Sheets)**

**Answer Question 6 and any two Questions from Question 7 to 10**

6. Find the expression for the energy of a charged conductor. 2.5  
  
OR  
Why soft iron is used as the core of an electromagnet?

7. Derive an expression for the growth of charge on a condenser connected to a resistor in series to which a steady e.m.f is applied. 5
8. Derive an expression for the magnetic field intensity at a point on axis of a circular coil of wire carrying electric current. 5
9. State and explain Ampere's circuital theorem. 5
10. Discuss how a hysteresis loop is useful in the study of different magnetic properties of material.

**Group: 3**

**(Answer in separate Answer-Sheets)**

**Answer Question 11 and any two Questions from Question 12 to 15**

11. What are stokes and antistokes lines? 2.5  
OR  
Write down the symbol of OR gate & and gate 2.5
12. Define current gain of  $\alpha$  and  $\beta$  of a transistor 5
13. Draw the output characteristics of n-p-n transistor in C.E mode. 5
14. State De-Morgan's theorems. Draw a ckt. Diagram of a 2-input OR gate with the help of diodes. 2+3
15. Design an OR gate using NAND gates. 5

**Group: 4**

**(Answer in separate Answer-Sheets)**

**Answer all the Questions**

16. Define moment of inertia. Write the working formula for determining moment of inertia Of an unknown bar using the dimensions of a known cylinder. What type oscillation occurs here. 2+2+1
17. Define Young's modulus. Draw the load depression curve of Young's modulus determination experiment. Will the value of Y change if breadth and depth of the beam are interchanged. 2+2+1
18. **Answer any one question** 2.5
  - i) What is radius of gyration?

ii) What is neutral surface of a beam?