



22102160

**QP CODE: 22102160**

**Reg No** : .....

**Name** : .....

**B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE  
EXAMINATIONS, JULY 2022**

**First Semester**

**Core Course - PH1CRT01 - METHODOLOGY AND PERSPECTIVES OF PHYSICS**

(Common to B.Sc Physics Model I, B.Sc Physics Model II Applied Electronics, B.Sc Physics Model II Computer Applications, B.Sc Physics Model III Electronic Equipment Maintenance)

2017 Admission Onwards

DF0DF96D

Time: 3 Hours

Max. Marks : 60

**Part A**

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Write down the year and the contribution for which J J Thomson was awarded Nobel prize.
2. How many times Marie Curie won the Nobel prize and for what?
3. Who explained the blue colour of the sky successfully for the first time?
4. What was Max Planck's major contribution to physics?
5. Convert hexadecimal value  $(A16)_{16}$  to decimal.
6. What is sign magnitude numbers?
7. What are the disadvantages of BCD code?
8. Express the relation between  $(x, y, z)$  and  $(r, \theta, \phi)$
9. What do you understand by the sensibility of a balance?
10. With reference to pendulum clock what is meant by escapement.
11. What is the equivalent resistance of an ideal ammeter and an ideal voltmeter?





12. What are the rules in rounding off numbers?

(10×1=10)

**Part B**

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Write a note on the contributions of Werner Heisenberg.
14. What is Chandrasekhar limit? What is its importance?
15. Add the following binary numbers a)  $110.11 + 11$  b)  $111.101 + 11.1$  c)  $10 + 111$  d)  $1010 + 10001$ .
16. Perform the subtraction in 2's complement method and check in decimal system: i)  $1101 - 1$  ii)  $100 - 1101$  iii)  $1100.1 - 11.11$ .
17. A body of mass 500g, free to move, is subjected to a force of  $i+2j+k$  N. What velocity will it acquire after 4s and what distance will it have covered in that interval of time?
18. The vernier scale of a travelling microscope has 50 divisions which coincide with 49 main scale divisions. If each main scale division is 0.5 mm, calculate the minimum inaccuracy in the measurement of distance.
19. Time for 20 oscillations of a pendulum is measured as  $T_1 = 39.6s$ ,  $T_2 = 39.9s$ ,  $T_3 = 39.5s$ . What is the precision in measurements? What is the accuracy of the measurement?
20. In an experimental measurement, the refractive index of water is measured as 1.29, 1.33, 1.34, 1.35, 1.32, 1.36, 1.30 and 1.33. Calculate the mean value, absolute error, the relative error and percentage error.
21. The kinetic energy of a moving object is calculated as  $\frac{1}{2}mv^2$ . The mass of an object was measured with a 4% uncertainty and its velocity with a 3% uncertainty. What will be the uncertainty in its calculated kinetic energy?

(6×5=30)

**Part C**

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Discuss the major contributions of Albert Einstein to modern science.





23. Write down the steps to subtract bigger number from smaller number and vice versa in 2's complement form. Perform the following subtraction in 1's complement and check the result in ordinary binary subtraction method. i)  $1001 - 110$  ii)  $10001 - 100$  iii)  $1001 - 1101$  iv)  $111.01 - 100.11$  v)  $1001.01 - 11.011$
24. If  $p = yz^2 \mathbf{i} - 3xz^2 \mathbf{j} + 2xyz \mathbf{k}$  and  $q = 3x \mathbf{i} + 4z \mathbf{j} - xy \mathbf{k}$  and  $f = xyz$ . Find
- i)  $p \times (\nabla f)$
  - ii)  $(\nabla \times p) \times q$
  - iii)  $q \cdot (\nabla \times p)$
  - iii)  $(p \times \nabla)f$
25. Explain how angle of a prism can be measured using a spectrometer.

(2×10=20)

