B.Sc. CHEMISTRY

SECOND SEMESTER

PHYSICS-II

BPH-721

Duration: 3 Hrs.   Marks: 70

$\left\{ \begin{array}{l} \text{Part : A (Objective)} = 20 \\ \text{Part : B (Descriptive)} = 50 \end{array} \right\}$

Duration: 2 Hrs. 40 Mins.   Marks: 50

[PART-B : Descriptive]

[Answer question no. One (1) & any four (4) from the rest]

1. Find the electric field due to solid sphere of radius R and total charge Q at points **(a)** inside the sphere, **(b)** on the surface of the sphere and **(c)** outside the sphere.   4+2+4 =10

2. Find the magnetic field due to a current carrying **(a)** solenoid and **(b)** toroid.   5+5=10

3. Find the capacitance of **(a)** spherical capacitor and **(b)** parallel plate capacitor.   6+4=10

4. Write the three statements of 2nd law of thermodynamics. Derive an expression for work done on an ideal gas in isothermal process.   6+4=10

5. Derive an expression for pressure exerted by an ideal gas using kinetic theory of gas.   10

6. Find the expression for efficiency of a Carnot reversible engine.   10

7. Find the conditions for constructive and destructive interference in Young's double slit experiment. Also find the expression for fringe width.   7+3=10

8. Explain the terms **(a)** spontaneous emission **(b)** stimulated emission and **(c)** stimulated absorbsion. Draw the diagram showing basic components of a LASER.   6+4=10

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B.Sc. CHEMISTRY

SECOND SEMESTER

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Duration: 20Mnts.   Marks: 20

[PART-A : Objective]

Choose the correct answer from the following: 1×20=20

1. The unit of electric field is
   - a. Nm
   - b. NC
   - c. NC^{-1}
   - d. volt

2. $\dfrac{1}{4\pi \varepsilon_0} = $ ....Nm^2C^{-2}
   - a. 10
   - b. 9×10^8
   - c. 9×10^9
   - d. 1

3. Electric potential of a point charge at infinity is equal to
   - a. 0 (Zero)
   - b. ∞
   - c. Not defined.
   - d. None of the above.

4. The electric field inside a hollow cylinder is
   - a. Proportional to distance.
   - b. 0 (Zero)
   - c. Proportional to inverse of distance.
   - d. None of the above.

5. The magnetic field inside a hollow cylinder is
   - a. Proportional to inverse of distance.
   - b. Proportional to distance.
   - c. 0 (Zero)
   - d. Constant but not zero.

6. The electric field inside a solid sphere is
   - a. Proportional to inverse of distance square.
   - b. Proportional to inverse of distance.
   - c. Proportional to distance.
   - d. 0 (Zero)

7. The unit of μ_0
   - a. T
   - b. TmA
   - c. TmA^{-1}
   - d. Tm

8. PV has the same dimension with
   - a. work
   - b. power
   - c. force
   - d. temperature

9. In an isothermal process, the change in temperature
   - a. Positive
   - b. 0 (Zero)
   - c. Negative
   - d. None of the above.

10. Degrees of freedom of a mono atomic is
    - a. 2
    - b. 5
    - c. 3
    - d. 7

11. The mechanical equivalent of heat J is equal to
    - a. 4.2 cal/J
    - b. 4.4 J/cal
    - c. 4.2 J/cal
    - d. 4.4 cal/J

12. The unit of Planck's constant is
    - a. Jm
    - b. Js
    - c. Js^{-1}
    - d. J

13. All processes in the universe are
    - a. Reversible
    - b. Irreversible
    - c. Adiabatic
    - d. Cyclic

14. For reversible process, the change in entropy is
    a. Positive
    b. 0 (Zero)
    c. Negative
    d. None of the above

15. For a convex lens radius of curvature is 50cm. Its focal length is equal to
    a. 50cm
    b. 25cm
    c. 1m
    d. 2m

16. For a concave lens, the focal is taken to be (according to sign convention)
    a. Positive
    b. Negative
    c. May be positive or negative
    d. None of the above

17. For constructive interference, the path difference should be equal to
    a. $m\lambda$, m=0,1,2…
    b. $(2m+1)\lambda$, m=0, 1, 2, 3…..
    c. $m\lambda$, m=0.5, 1.5, 2.5,3.5….
    d. None of the above.

18. When light incidents on a thin film and reflection occurs backed by rarer medium, the additional phase difference is equal to
    a. 0 (Zero)
    b. $\pi/2$
    c. $\pi/3$
    d. π

19. The phenomenon of polarization proves that light is a
    a. Transverse electromagnetic wave
    b. Longitudinal electromagnetic wave
    c. Collection of particles
    d. None of the above

20. For population inversion, the life time of the meta-stable state should be
    a. small
    b. large
    c. 0 (Zero)
    d. None of the above

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UNIVERSITY OF SCIENCE & TECHNOLOGY, MEGHALAYA

Question Paper CUM Answer Sheet

[PART (A) : OBJECTIVE]

Course : ....

Semester : .... Roll No : ....

Enrollment No : .... Course code : ....

Course Title : ....

Session : .... 2016-17 .... Date : ....

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Instructions / Guidelines

- The paper contains twenty (20) / ten (10) questions.
- The student shall write the answer in the box where it is provided.
- The student shall not overwrite / erase any answer and no mark shall be given for such act.
- Hand over the question paper cum answer sheet (Objective) within the allotted time (20 minutes / 10 minutes) to the invigilator.

Full Marks	Marks Obtained	Remarks
20		

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Scrutinizer's Signature   Examiner's Signature   Invigilator's Signature