S.NO. 277 BATCH: 87 – 2018 Reg. No.

END OF SEMESTER EXAMINATIONS, NOVEMBER - 2018
PHYSICS - I
SUBJECT CODE: 16UBPH01

MAJOR: B.Sc. (Mathematics) **SEMESTER : I**
TIME : 3 HOURS **MAX. MARKS: 75**

SECTION – A (10 X 1 = 10)

Answer ALL the Questions:

1. According to special theory of relativity, the velocity of light is _____ in free space.
   a) zero b) variable c) constant d) none of the above
2. Which of the following materials exhibit piezo-electric effect?
   a) platinum b) quartz crystal c) sodium chloride d) copper
3. A bar of uniform cross section whose length is very much greater than its thickness is called a _____.
   a) beam b) canti lever c) couple d) optic lever
4. The selection rule for rotational transition is
   a) $\Delta J = 0$ b) $\Delta J = +1$ c) $\Delta J = -1$ d) $\Delta J = \pm 1$
5. What is the correction term for pressure in Van der Waal's equation?
   a) $PV = RT$ b) $P + \frac{a}{v^2}$ c) $P - \frac{a}{v^2}$ d) none of the above
6. The temperature at which Joule – Thomson effect is zero and changes sign is called _____.
   a) critical temperature b) Boyle temperature
   c) temperature of inversion d) none of the above
7. The efficiency of Carnot engine is always _____ unity.
   a) less than b) greater than c) equal to d) none of the above
8. Which of the following methods is used to determine the thermal conductivity of bad conductors?
   a) Forbes method b) Searle's method
   c) Lee's disc method d) Angstrom's method
9. The specific conductivity σ of an electrolyte is given by the expression
   a) $\sigma = \frac{\ell}{a}$ b) $\sigma = \frac{1}{R}$ c) $\sigma = \frac{1}{\rho}$ d) $\sigma = \frac{\lambda}{c}$
10. Which of the following expressions gives the value of I_{rms}?
    a) $I_0 Sinwt$ b) $\frac{V}{R}$ c) $\frac{2I_0}{\pi}$ d) $\frac{I_0}{\sqrt{2}}$

SECTION – B (5 X 4 = 20)

Answer ALL the Questions:

11. a) Explain time dilation. Obtain an expression for it.

(OR)

b) Derive the equation of an undamped vibration.

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12. a) Obtain an expression for the work done in stretching a wire.

(OR)

b) Explain quantum theory of Raman effect.

13. a) Derive Van der Waal's reduced equation of state.

(OR)

b) Mention the properties of Liquid Helium.

14. a) Write a short note on reversible and irreversible process.

(OR)

b) Derive Stefan's law.

15. a) Discuss the salient features of Arrhenius theory of electrolytic dissociation.

(OR)

b) Derive an expression for mean value and rms value of alternating current.

SECTION – C (5 X 9 = 45)

Answer ALL the Questions:

16. a) Explain Length Contraction. Derive an expression for it.

(OR)

b) Explain the piezo electric crystal method for the production of ultrasonic waves.

17. a) With a neat diagram, explain the experimental method to determine the young's modulus by non-uniform bending method.

(OR)

b) Explain the experimental set-up to study Raman effect.

18. a) Derive Van der Waal's equation of state.

(OR)

b) Explain the porous – plug experiment and its result.

19. a) Explain Carnot's cycle.

(OR)

b) State and prove Kirchoff's law of heat radiation. Mention its applications.

20. a) Explain the determination of specific conductivity of electrolytes using Kohlrausch bridge method.

(OR)

b) Discuss the growth of current in a circuit containing resistance and inductance.

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