



11 Physics

Name: _____

Roll #: _____

T₄ - ch10,11. 27/04/2020

Time: 2h40m; Marks: 85

Wasim Tahir physics center

Q1) Choose the most appropriate option. Cutting / overwriting is not allowed:

17 Marks

- i) The final image formed by simple microscope is ____
A) Virtual and inverted B) Virtual and erect C) Real and erect D) Real and inverted
- ii) In reversible process the entropy of system
A) Remains constant B) Decreases C) Increases D) Becomes zero
- iii) The efficiency of Carnot engine depends on ____.
A) Sink temperature B) Source temperature C) Both source and sink temperature D) The working substance
- iv) The optical fiber is covered for protection by a
A) glass jacket B) plastic jacket C) copper jacket D) aluminum jacket
- v) The unit of entropy is ____
A) JK B) K/J C) J / K² D) J / K
- vi) The value of γ for diatomic gas is ____
A) 1.67 B) 1.4 C) 1.29 D) Infinity
- vii) The value of Boltzman's constant is:
A) 1.38×10^{-23} J/K. B) 1.38×10^{23} J/K C) 1.38×10^{-23} J/Kmole-K D) 1.38×10^{-23} J/Kmole-K
- viii) Which is the process in which temperature of the system remains constant?
A) Isobaric process B) Isochoric process C) Isothermal process D) Adiabatic process
- ix) If a single convex lens is placed close to eye, then it is being used as ____
A) Telescope B) Microscope C) Magnifying glass D) None of these
- x) The form of the first law of thermodynamics for adiabatic process will be ____
A) $Q = W$ B) $Q = -W$ C) $W = -\delta U$ D) $W = \delta U$
- xi) In the newer systems of fiber optics, signals are regenerated by placing repeaters which may be separated by as much as ____ km
A) 30 B) 50 C) 500 D) 100
- xii) The most important factor regarding the significance of the Carnot engine is that ____
A) It is practically possible B) Its efficiency is 100% C) it sets an upper limit of the efficiency D) It sets a lower limit on the efficiency
- xiii) Heat is a form of ____
A) Power B) Energy C) Troque D) Momentum
- xiv) Which combination can ensure less diffraction and more details to be seen by compound microscope?
A) a wider objective and red light B) a wider objective and blue light C) a wider eyepiece and red light D) a wider eyepiece and blue light
- xv) The minimum distance from the eye at which an object appears to be distinct is ____ cm
A) 15 B) 20 C) 25 D) 30
- xvi) A system does 600J of work and at the same time has its internal energy increased by 320J. How much heat has been supplied?
A) 280J B) 920J C) 600J D) 200J
- xvii) Information carrying capacity of optical fiber is called:
A) Capacity B) Bandwidth C) Immunity D) Ability

Q2) Write short answers of the following:

44 Marks

- i) Find the magnifying power of a convex lens of 10cm focal length.

- ii) Define total internal reflection.
- iii) Write down the three major components on which a fiber communication system consists.
- iv) If a person was looking through a telescope at the full moon, how would the appearance of the moon be changed by covering half of the objective lens?
- v) One can buy a cheap microscope for use by the children. The images seen in such a microscope have colored edges. Why is this so?
- vi) What is the function of collimator in a spectrometer?
- vii) What are uses of spectrometer?
- viii) Write down the names of the essential components of a spectrometer?
- ix) State Carnot's theorem.
- x) Can the mechanical energy be converted completely into heat energy? If so, give an example.
- xi) Give an example of a natural process that involves an increase in entropy.
- xii) Is it possible to convert internal energy into mechanical energy? Explain with an example.
- xiii) Why is the average velocity of the molecules in a gas zero but the average of the square of the velocities is not zero?
- xiv) Why does the pressure of a gas in a car tire increase when it is driven through some distance?
- xv) A thermo-flask containing milk as a system is shaken rapidly. Does the temperature of the milk rise?
- xvi) Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?
- xvii) Does entropy of a system increase or decrease due to friction?
- xviii) State second law of thermodynamics in terms of entropy.
- xix) Why adiabat is steeper than isotherm? Explain.
- xx) Is it possible to construct a heat engine that will not expel heat into the atmosphere?

Give explanatory answer of the following:

24 Marks

- 3) Define and explain a simple microscope.
- 4) Describe the construction and working of compound microscope and derive an expression for magnifying power.
- 5) Prove that the absolute temperature of an ideal gas is directly proportional to the average translational kinetic energy of gas molecules.
- 6) 336J of energy is required to melt 1g of ice at 0°C . What is the change in entropy of 30g of water at 0°C as it is changed to ice at 0°C by a refrigerator?
- 7) A Carnot engine whose low temperature reservoir is at 7°C has an efficiency of 50%. It is desired to increase the efficiency to 70%. By how many degrees the temperature of the source be increased?
- 8) Calculate entropy change when 1kg ice at 0°C melts into water at 0°C . latent heat of fusion of ice:
 $L_f = 3.36 \times 10^5 \text{ J/kg}$.