

Name of the Student: \_\_\_\_\_

**Question No. 1 Encircle the correct option.****(20)**

- i. The least distance of distinct vision for a normal eye is  
a. 25 cm                      b. 26 cm                      c. 27 cm                      d. 28 cm
- ii. When object is held at focus point the image is formed  
a. at focus point              b. away from focus point      c. between focus point and centre of curvature      d. at infinity
- iii. The magnifying power of compound microscope is equal to  
a.  $q/p (1+d/f_o)$               b.  $q/p (1+d/f_e)$               c.  $q/p (1+ f_e/f_o)$               d.  $q/p (1+ f_o/d)$
- iv. In an astronomical telescope, objective of large focal length is used because  
a. object is very small      b. object is very close      c. object is very large and very far away      d. none of these
- v. The focal length of a convex lens is 10 cm, its magnifying power is equal to  
a. 11                              b. 10                              c. 4.5                              d. 3.5
- vi. The principle of communication of data through fiber optics is based upon  
a. diffraction                      b. polarization      c. continuous refraction                      d. continuous refraction and TIR
- vii. The data is transferred through single mode step index fiber with  
a. laser light                      b. ordinary light                      c. infrared light                      d. x-rays
- viii. The main sources of loss of data in fiber optics are  
a. scattering                      b. absorption                      c. dispersion                      d. all of these
- ix. The ability of an optical instrument to reveal minor details is called  
a. magnifying power      b. refraction                      c. resolving power                      d. magnification
- x. The layer over the central core of fiber optics is called  
a. jacket                              b. cladding                              c. plastic                              d. rubber
- xi. The diameter of core of multimode graded index fiber is  
a. 50 to 100  $\mu\text{m}$                       b. 50 to 200  $\mu\text{m}$                       c. 50 to 500  $\mu\text{m}$                       d. 50 to 1000  $\mu\text{m}$
- xii. A single convex lens is placed close to eye, it is being used as  
a. telescope                              b. simple microscope                              c. compound microscope                              d. diverging lens
- xiii. When slit is at the focus of the convex lens of collimator in spectrometer, the light rays becomes  
a. perpendicular                      b. parallel                              c. anti-parallel                              d. at  $60^\circ$
- xiv. The length of an astronomical telescope, when it is in normal adjustment, is equal to  
a.  $f_o / f_e$                               b.  $f_e / f_o$                               c.  $f_o - f_e$                               d.  $f_o + f_e$
- xv. Photodiode is used convert light signal to  
a. electrical signal                      b. sound signal                              c. both a&b                              d. cannot be used as convertor
- xvi. Microphone is used to convert  
a. electrical signal to sound signal                              b. sound signal to electrical signal  
c. electrical signal to light                              d. light of sound signal
- xvii. A convex lens acts as diverging lens when the object is placed  
a. at  $2f$                               b. between  $f$  and  $2f$                               c. at  $f$                               d. inside focus
- xviii. The image formed by a convex lens of  $f= 10$  cm is twice the size of the object. The position of the object will be  
a. 20 cm                              b. 50 cm                              c. 30 cm                              d. 15 cm
- xix. Which is the optical instrument  
a. telescope                              b. microscope                              c. spectrometer                              d. all of these
- xx. In optical fiber communication system, the wavelength of light used is  
a. 1.3  $\mu\text{m}$                               b. 1.5  $\mu\text{m}$                               c. 5  $\mu\text{m}$                               d. 50  $\mu\text{m}$

**Question No. 2 Write short answers of any six of the folioing questions.****2x6=12**

- i. What do you understand by linear and angular magnification?
- ii. Explain the difference between angular magnification and resolving power of an optical instrument. What limits the magnification of an optical instrument?
- iii. Why would it be advantageous to use blue light with a compound microscope?
- iv. How the light signal is transmitted through the optical fiber?
- v. 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?
- vi. How the power is lost in optical fiber through dispersion? Explain.
- vii. List the three main parts of a spectrometer.
- viii. Differentiate between cladding and jacket.

**Q. No. 3 a.** What is compound microscope? Explain image formation by it in detail with ray diagram. Also calculate its magnifying power. **(5)**

- a. An astronomical telescope having magnifying power of 5 consist of two thin lenses 24 cm apart. Find the focal lengths of the lenses. **(3) OR**

**Q.No. 4 a.** Describe principle and construction of apparatus used by Michelson to calculate the speed of light. Also calculate the speed of light. **(5)**

b. A telescope is made of an objective of focal length 20 cm and an eye piece of 5.0 cm, both convex lenses. Find the angular magnification. **(3)**