Std. 12   Time : 1½ hr.
12-12-2016   Third Unit Test in **PHYSICS**   M. Marks: 35

1.   Two metals A and B have work functions 2eV and 4eV respectively. Which metal has a lower
      threshold wavelength for emission of electrons?   (1)

2.   Why silicon is preferred over germanium in the manufacture of semiconducting devices?   (1)

3.   In a common emitter circuit, if potential of collector with respect to emitter changes by 0.2V
      and collector current changes by 0.004mA. What is the output resistance?   (1)

4.   Define the term potential barrier and depletion region for PN junction diode. State how
      thickness of a depletion region will change when the diode is forward biased.   (2)

5.   Identify the name of the gate given below and write its truth table. Two trains of pulses are
      given as inputs at A and B. Draw the output form at Y.   (2)
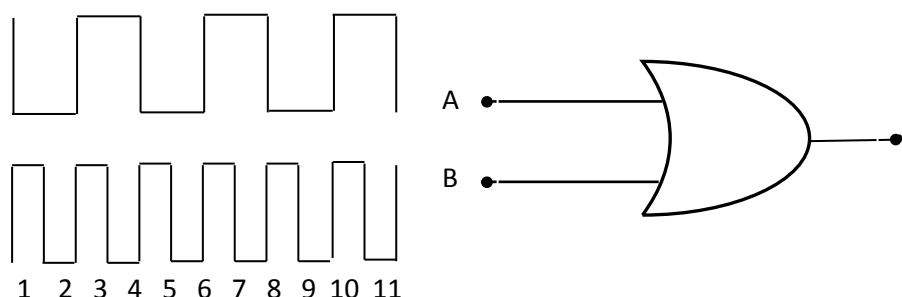

6.   An electron is accelerated through a potential difference of 54V. Calculate the de Broglie
      wave length associated with the electrons.   (2)

7.   What do you mean by threshold frequency? How the photo electric current changes with the
      voltage in a photo tube for different frequencies incident light but of same intensity. Show
      the variation of current graphically.   (2)

8.   The following data was recorded in experimental study of real image formation by a
      convex lens of power 4D. One of these observations is incorrect. Identify it by giving
      reason.   (2)

S.No	1	2	3	4	5
U(cm)	30	35	40	55	65
V(cm)	80	60	45	32	38

(OR)

Light rays of three different colours incident on a right angled prism as shown in the
figure. Complete path of emergent light ray with necessary calculations. Given that
$\mu_{violet} = 1.5$ $\mu_{green} = 1.41$ $\mu_{red} = 1.40$ (2)
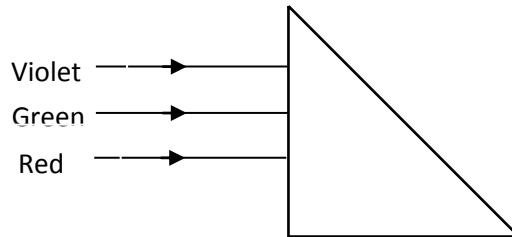
9. An object is placed at a distance of 30cm in front of a convex lens of focal length 10cm. Calculate the position of the image and the new position of the image if a concave lens of focal length 10cm is placed at a distance if 10cm from the first lens and coaxially. (2)

10. Use mirror equation to deduce that convex mirror always produces a virtual and diminished image irrespective of position of object. (2)

11. State Huygens's principle. Explain the construction of refracted wave front using Huygens's principle if a plane wave front incidents obliquely on a plane interface (2)

12. Explain how does a common emitter npn transistor work as an amplifier? Draw a neat circuit diagram showing the input and output clearly. Write the expression for voltage amplification factor. (3)

13. State the condition under which the phenomenon of diffraction of light takes place. Explain the formation secondary maxima and minima due to diffraction on a single slit and obtain the condition for observing secondary maxima and minima. (3)

14. Derive lens maker's formula; hence establish the relation for power of a plano concave lens Using lens maker's formula. Explain under what condition a convex lens will behave as a diverging lens? (3+1+1)

15. (i) In a Young's double slit experiment the slits are 0.2mm apart and the screen is 1.5m away. It is observed that the distance between central bright fringe and fourth dark fringe is 1.8cm. Find the wave length of light used. What would be the fringe width if the whole apparatus is immersed in water of refractive index 4/3?
    (ii) IF two sources of intensities I and 9I are used. Obtain the intensity at a point where the two waves interfere with a path difference of $\lambda/4$. (3+2)

-x-x-x-x-x-x-