

NEW STANDARD ACADEMY

Date : 13-10-25

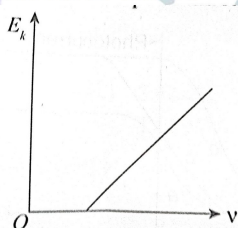
CLASS : 12TH

Marks: 60

Time: 3 hours

PHYSICS

1. The momentum of photon of energy 1 MeV will approximately be
2. The human eye can barely detect a yellow light ($\lambda = 6000\text{\AA}$) that delivers $1.7 \times 10^{-18} \text{ W}$ to the retina. The number of photons per second falling on the eye is nearest to
3. Light of frequency 4.5 times the threshold frequency is incident on a photosensitive material. If the frequency is halved and intensity is doubled, then the photocurrent becomes
4. The threshold wavelength for a metal whose work function is W_0 is λ_0 . What is the threshold wavelength for a metal whose work function is $W_0 / 2$?
5. A graph is plotted between maximum kinetic energy E_k of electrons with frequency of incident photon (ν) in Photoelectric effect. The slope of the curve will be



6. The maximum velocity of electrons emitted from a metal surface is v . What would be the maximum velocity if the frequency of incident light is increased by a factor of 4?
7. A photon of energy 8 eV is incident on a metal surface of threshold frequency $1.6 \times 10^{15} \text{ Hz}$. The kinetic energy (in eV) of the photoelectrons emitted is (Take $h = 6 \times 10^{-34} \text{ Js}$)
8. A moving car of 2000 kg mass and velocity of 30 m s^{-1} has associated de-Broglie wavelength given by?
9. The de-Broglie wavelength of a neutron at 27°C is λ . What will be its wavelength at 927°C
10. An α -particle moving horizontally makes a head on collision elastically with a proton (at rest). What is the ratio of de-Broglie wavelengths associated with α -particle and proton just after collision?

CHIMESTRY

1. How will you convert the following:
(i) ethanol to lactic acid
(ii) acetone from CH_3COCl
(iii) ethanal from ethanoic acid
(iv) methanal to ethanal
2. How will you convert acetaldehyde into :
(i) Butan-2-one
(ii) Butan-1-ol
3. Write the structural formulae and IUPAC name of all the carbonyl compounds having the molecular formulae $\text{C}_5\text{H}_{10}\text{O}$.
4. Arrange the following compounds in increasing order of their boiling points: CH_3CHO , $\text{C}_2\text{H}_5\text{OH}$, CH_3OCH_3 , $\text{CH}_3\text{CH}_2\text{CH}_3$
5. Give the reagents to bring about the following conversions:
(a) Butan-1-ol to Butanal
(d) But-2-ene to Ethanal
6. Arrange the following carbonyl compounds in increasing order of their reactivity towards nucleophilic addition reactions:
(a) Ethanal, propanal, propanone, butanone
(b) Benzaldehyde, p-tolualdehyde, p-nitrobenzaldehyde, acetophenone.
7. Dipole moments of aldehydes and ketones are higher than those of alcohols, explain.
8. The double bond ($\text{C}=\text{C}$) in alkenes and double bond ($\text{C}=\text{O}$) in carbonyl compounds have π electrons. Yet they exhibit different type of addition reactions, explain.
9. You are provided with the following four reagents:
(a) LiAlH_4 , (b) I_2/NaOH , (c) NaHSO_3 and (d) Schiff's reagent.
Write which two reagents can be used to distinguish between the compounds in each of the following pairs?
(a) CH_3CHO and CH_3COCH_3
(b) CH_3CHO and $\text{C}_6\text{H}_5\text{CHO}$

10. How will you convert: (a) 2-Bromopropane into acetone, (b) acetone to ethanoic acid ?

BIOLOGY

1. Define commensalism with an example.
2. Define mutualism with an example.
3. What is parasitism? Give one example.
4. What is predation?
5. Define competition with example.
6. What is the difference between natality and mortality?
7. What is immigration and emigration in population?
8. What does the term "age pyramid" represent?
9. Name the factors that influence population density.
10. What is the significance of population growth curve?

MATHS

1. A and B are two independent events such that $P(A \cap \bar{B}) = \frac{1}{4}$ and $P(\bar{A} \cap B) = \frac{1}{6}$. Find $P(A)$ and $P(B)$
2. A bag contains one black and two white balls. A drawing from the bag consists of taking a ball from the bag and keeping it out if it is white but putting it back if it is black. Calculate the probabilities that
 - (i) the first drawing is a white ball
 - (ii) the second drawing is a white ball
3. An urn contains 7 white, 5 black and 3 red balls. Two balls are drawn at random. Find the probability that
 - (i) both balls are red
 - (ii) one ball is red, the other is black
 - (iii) one ball is white.
4. A fair coin and an unbiased die are tossed. Let A be the event 'head appears on the coin' and B be the event '3 on the die'. Check whether A and B are independent events or not.
5. A problem in mathematics is given to three students whose chances of solving it are $\frac{1}{3}$, $\frac{2}{7}$ and $\frac{3}{8}$ respectively. If all the three try to solve the problem simultaneously, then find the probability that exactly one of them can solve it.
6. Three friends A, B and C got their photograph clicked. Find the probability that B is standing at the central position, given that A is standing at the left corner.

7. An instructor has a question bank consisting of 300 easy True/False questions, 200 difficult True/False questions, 500 easy multiple choice questions and 400 difficult multiple choice questions. If a question is selected at random from the question bank, then what is the probability that it will be an easy question given that it is a multiple choice question?
8. Assume that each child born is equally likely to be a boy or a girl. If a family has two children, then what is the conditional probability that both are girls, given that
 - (i) the youngest is a girl
 - (ii) atleast one is a girl?
9. If A and B are events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$, then find:
 - (I) $P(A|B)$
 - (II) $(B|A)$
 - (III) $(A'|B)$
10. If A and B are two events such that $P(A) = 0.4$, $P(B) = 0.3$ and $P(A \cup B) = 0.6$, then find $P(B' \cap A)$.