NEW STANDARD ACADEMY

Marks: 80

Date : 21-04-25 **CLASS : 10TH** **Time: 3 hours.**

PHYSICS

1. A 2 cm high object is placed at a distance of 20 cm from a concave mirror. A real image is formed at 40 cm from the mirror. Calculate the focal length of the mirror.
2. The distance between the centre of curvature and the pole of a concave mirror is 20 cm. Calculate the focal length of the mirror.
3. Refractive index of diamond with respect to glass is 1.6 and the absolute refractive index of glass is 1.5. Find out the absolute refractive index of diamond
4. Light enters from air into glass having refractive index 1.50. What is the speed of glass? The speed of light in vacuum is 3×10^8 ms^{-1}
5. If the refractive index of glass for light going from air to glass is 3/2, find the refractive index for light going from glass to air.
6. The absolute refractive indices of water and glass are 4/3 and and 3/2 respectively. If the speed of light in glass is 2×10^8 m s^{-1} calculate the speed of light in
   (i) vacuum (ii) water.
7. A ray of light strikes a glass slab at an angle of incidence equal to 30°. Find the refractive index of glass such that the angle of refraction is 19.5°.
   (Take sin 19.5° = 1/3 and sin 30° = 1/2)
8. For the same angle of incidence in media A, B and C, the angles of refraction are 20^0 30^0 and 40^0respectively. In which medium will the velocity of light be maximum? Give reason in support of your answer.
9. A ray of light enters into benzene from air. If the refractive index of benzene is 1.50, by what percent does the speed of light reduce on entering the benzene?
10. The absolute refractive index of Ruby is 1.7. Find the speed of light in Ruby. The speed of light in vacuum is 3×10^8 m s^{-1}

CHEMISTRY

1. Explain with examples the displacement and double displacement reactions. What is the difference between these two reactions?
2. Name the reducing agent in the following:
   $3MnO_2 + 4A1 \rightarrow 2A1_2O_3 + 3Mn$
   State which metal is more reactive?
3. A metal salt MX, when exposed to light, splits up to form the metal M and the gas X_2. Metal M is used in making ornaments, whereas gas X_2 is used in making bleaching powder. The salt MX is itself used in black and white photography.
   (i) Identify metal M and gas X_2.
   (ii) Mention the type of chemical reaction, involved when salt MX is exposed to light?
4. Translate the following statements into chemical fequations, and then balance the equations:
   (i) Phosphorus burns in oxygen to give phosphorus pentoxide.
   (ii) Aluminium metal replaces iron from ferric oxide, Fe_2O_3 giving aluminium oxide and iron.
5. Write two examples of double displacement reactions
6. Define Chemical reaction & write the characteristics of chemical reaction. With one one example.
7. What is oxidation & Reduction. Give example.
8. What do you mean by Chemical equation? Write rules of writing the Chemical equation
9. Define redox with example
10. Write the balanced chemical equations for the following reactions and identify the type of reaction in each case.
    (i) Nitrogen gas is treated with hydrogen gas in the presence of a catalyst at 773 K to form ammonia gas.
    (ii) Sodium hydroxide solution is treated with acetic acid to form sodium acetate and water.

BIOLOGY

1. What is the respiration give the chemical equation?
2. What is the alcoholic fermentation give the example?
3. What is lactic acid fermentation give the example ?
4. What is the site of glycolysis give the name of product form this process?
5. Where kreb cycle take place and what is the product of this cycles?
6. How many ATP, CO2 and NADH2 form in krebs cycle ?
7. What is the difference between aerobic and anaerobic respiration?
8. What is the photo autotroph give the example?
9. What is the product of light reaction in photosynthesis?
10. What is saprotroph give the example?

MATH

1. If $\alpha and\ \beta$ are zeroes of the polynomial $6y^2-7y+2$, find a quadratic polynomial whose zeroes are $\frac{1}{\alpha}, \frac{1}{\beta}$.
2. Find all the zeroes of the polynomial x^3+3x^2-2x-6 if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.
3. Find the value of m if one zero of the polynomial $(m^2+4)x^2+63x+4m$ is reciprocal of the other.
4. If $\alpha\ and\ \beta$ are zeroes of the polynomial $3x^2-4x-7$ then form a quadratic polynomial whose zeroes are $\frac{1}{\alpha} and \frac{1}{\beta}$.
5. Find the value (s) of k for which the following pairs of linear equations will have infinitely many solutions:
   Kx + 3y - (k – 3) = 0, 12x + ky – k = 0
6. Find the value (s) of k for which the following pairs of linear equations have infinite solutions:
   $2x + 3y - 7 = 0, (k-1)x + (k+1)y = 3k-1$
7. Aftab tells his daughter , “Seven years ago , I was seven times as old as you were then .Also three years from now, I shall be three times as old as you will be” Find their present ages.
8. Find the values of $\alpha and\ \beta$ for which the following pair of linear equations has infinite number of solutions:
   $2x+3y=7; \alpha x + (\alpha + \beta)y = 28.$
9. A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator and it becomes $\frac{1}{2}$ when 1 is subtracted from the denominator .Find the fraction.
10. Two numbers are in the ratio 5:6. If 7 is subtracted from each of the numbers the ratio becomes 4:5. Find the numbers.