

CLASS 12 Holiday Homework (Science)

TOPICS OF PHYSICS PROJECT

1. HALF WAVE RECTIFIER
2. FULL WAVE RECTIFIER
3. BRIDGE RECTIFIER
4. STEP DOWN TRANSFORMER
5. SOLAR MOBILE CHARGER
6. PIEZOELECTRIC CHARGER
7. BASIC LOGIC GATES (AND, OR, NOT)
8. NAND GATE
9. NOR GATE
10. EX OR GATE
11. EX. NOR GATE
12. FACTORS AFFECTING INTERNAL RESISTANCE OF CELL
13. TO FIND REFRACTIVE INDEX OF DIFFERENT LIQUIDS BY USING HOLLOW PRISM
13. WIRELESS ELECTRICITY
14. TRANSISTOR AS AN AMPLIFIER
15. CHARGING AND DISCHARGING OF CAPACITOR
16. MOBILE PHONE DETECTOR
16. TRANSISTOR AS A SWITCH
17. FM RECEIVER PLATE
18. METAL DETECTOR
19. JUMPING RING
20. TO STUDY EARTH MAGNETIC FIELD
21. LDR CIRCUIT
22. ZENER DIODE AS VOLTAGE REGULATOR
23. ELECTRONIC EYE
24. MAGNETIC LINEAR ACCELERATOR
25. AUTOMATIC ELECTRIC TRAIN BARRIER
26. DIGITAL COUNTER
27. LOW COST EMERGENCY LIGHT

28. BATTERY ELIMINATOR

29. SOLAR CONCENTRATORS AND HOW THEY AFFECT THE PERFORMANCE OF SOLAR CELL

30. THE GAUSS RIFLE

NOTE:-

1. PREPARE THE WORKING MODEL AND PROJECT REPORT AS DISCUSSED IN CLASS

2. ALLOTMENT OF PROJECTS

12 A 1 ---ROLL NO 1 TO 30 AS PER TO SERIAL NO.

ROLL NO 31 TO 44 SERIAL NO. 17 TO 30

12 A 2 ----. ROLL NO 1 TO 30 AS PER TO SERIAL NO.

ROLL NO 31 TO 57 SERIAL NO. 3 TO 30

UNIT - 3

ELECTROCHEMISTRY

2 Marks Questions

- 1 How many faraday of charge is required for conversion of $C_6H_5NO_2$ into $C_6H_5NH_2$?
Explain why Zn dissolves in dil. HCl to liberate $H_2(g)$ but from conc. H_2SO_4 , the gas evolved is SO_2 .
- 2 Cu does not dissolve in HCl but dissolves in nitric acid. Explain why?
- 3 Fluorine has a low electron gain enthalpy compared to chlorine, yet it is a more powerful oxidant. Explain why?
- 4 If Zn^{2+}/Zn electrode is diluted 100 times, then what will be the change in emf?
- 5 You are acquainted with the construction and working of a lead-storage battery. Give the plausible reasons for these facts:
 1. There is only a single compartment unlike other electrochemical cells.
 2. Replacement of water is necessary for maintenance.
- 6 For what concentration of $Ag^+(aq.)$, will the emf of given cell be zero at $25^\circ C$, if the concentration of $Cu(s) | Cu^{2+}(0.1M) || Ag^+(aq.) | Ag(s)$?
Given, $E^0_{Ag^+/Ag} = 0.80V$; $E^0_{Cu^{2+}/Cu} = 0.34V$.
- 7 In a small town along the coastal area, it is observed that iron objects rust easily. Being an industrial town, it also faces air pollution problem. Identify any 4 factors which are contributing to rusting phenomenon.
- 8 Iodine (I_2) and Bromine (Br_2) are added to a solution containing iodide (I^-) and bromide ions (Br^-). What reaction would occur if the concentration of each species is 1M? The electrode potentials are $E^0_{I_2/I^-} = 0.54V$ and $E^0_{Br_2/Br^-} = 1.08V$

3 Marks Questions

- 10 In an industrial plant, aluminium is produced by electrolysis of alumina dissolved in cryolite. This takes a current of 20000A. If the current efficiency is 90%, how much Al will be produced per day?
- 11 In an experiment θ — F was passed through 400 mL of 1M soln. of NaCl. What would be pH of soln. after electrolysis.
- 12 Estimate the minimum P.D. needed to reduce Al_2O_3 at 500 0 C. The free energy change for the decomposition reaction is 960 kJ.
 $2/3 \text{Al}_2\text{O}_3 \quad 4/3 \text{Al} + \text{O}_2; \quad \text{N} \quad \text{N}$
13. A cell with N/50 KCl soln. offered a resistance of 550 ohms at 298 K. The specific conductance of N/50 KCl at 298 K is 0.002768 ohm⁻¹cm⁻¹. When the cell is filled with N/10 ZnSO_4 soln, it offered a resistance of 72.18 ohms at 298 K. Find the cell constant and molar conductance of ZnSO_4 soln. at 298K.
14. Which of the following has larger molar conductance:
a. 0.08 M soln. having conductivity equal to $2 \times 10^{-2} \text{ohm}^{-1} \text{cm}^{-1}$.
b. 0.10 M soln. having resistivity equal to 5.8 ohm cm.
15. The K_{sp} of AgCl at 298 K is 1×10^{-10} . Calculate electrode potential of Ag electrode immersed in 1 M KCl soln..
[Given: $E^0 \text{Ag}^+/\text{Ag} = 0.799 \text{V}$]
16. Tarnished siver contains Ag_2S . Can this tarnish be removed by immersing the tarnished silverware in an Al pan containing an inert electrolyte soln. such as NaCl?
Given that standard electrode potentials for half reactions are:
 $\text{Ag}_2\text{S}(\text{s}) + 2\text{e}^- \quad 2\text{Ag}(\text{s}) + \text{S}^{2-}(\text{aq.})$ is -0.71 V
 $\text{Al}^{3+}(\text{aq.}) + 3\text{e}^- \quad \text{Al}(\text{s})$ is -1.66 V.

ASSIGNMENT QUESTIONS

BIOLOGY

Class: XII

CHAPTER 1: Reproduction in organism

- Name the vegetative propagules in the following.
i) Banana ii) Agave iii) Bryophyllum iv) Water Hyacinth
- Differentiate between the following .
a. Oviparous and viviparous b. Pre-fertilization and post-fertilization events
- How is the sexuality of papaya plant different from a maize plant?
- In which organisms gametes are non motile? How do they reach the female gamete for fertilization?
- Give reasons :
a) Rotifers are called Parthenocarpic organisms
b) Mammals living in natural wild condition are seasonal breeders

- c) Water Hyacinth is called an invasive weed
- d) Bamboo plants are considered to have unusual flowering response .
- e) *Marchantia* is considered dioecious

CHAPTER 2: Sexual Reproduction in Flowering plants

1. Explain the structure of megasporangium and female gametophyte with diagram.
2. Even though microspore has 2 male gametes why a plant require 10 microspores to fertilize 10 ovules .
3. Design the various steps that you would plan to combine desirable characters of 2 species .What are such experiments called ?
4. Draw LS of flower showing growth of pollen tube .
5. Draw a dicot embryo before and after a heart shaped embryo is formed .
6. Give reasons why :
 - a. Pollen products are sold in the market
 - b. Yucca moth deposits its eggs in the ovary locule of yucca plant.
 - c. Pollen of the wrong type does not germinate on stigma.
 - d. Active research is on to understand genetics of apomixes.
 - e. Pollens are well preserved in fossils

CHAPTER 3: Human Reproduction

1. Due to congenital defect , a woman does not have fimbriae in the fallopian tube .How will it affect her ?
2. What is the difference between spermiogenesis and spermiation?
3. What is the role of LH in a human male and female?
4. Justify giving reasons :
 - a. Corpus luteum secretes large amounts of progesterone if egg is fertilized .
 - b. During pregnancy there is a increase in the levels of hormones like estrogens, progesterons , cortisol ,prolactin,thyroxine etc in maternal blood.
 - c. Colostrum is absolutely essential for the newborn.
 - d. Placenta can be referred to as ‘ transporting organ ‘.
5. List out the sequence of events after fertilization upto implantation of the human embryo .
6. How many primary follicle will be there at the time of puberty in the human ovary ?

CHAPTER 4: REPRODUCTIVE HEALTH

1. Define reproductive health as given by WHO ?
2. What are the 3 important serious measures taken by Indian government to check the population growth rate ?
3. Justify giving reasons :
 - a. Sterilisation is referred as a terminal method of contraception.
 - b. Use of condoms have increased in recent years.
 - c. STD affected person often do not take proper treatment.

- d. Selection of a suitable contraceptive should always be done in consultation with qualified medical professionals.
4. Which is the most widely accepted method of contraceptive in India? Write a short note on it .
5. Name the following :
- a. A new oral contraceptive for the females that was developed in CDRI .
 - b. Foetal sex determination test based on the chromosomal pattern of the amniotic fluid .
 - c. Avoid coitus during the fertile period .
 - d. Contraceptive device that covers the vagina and cervix in female .
 - e. Contraceptive device that covers the cervix during coitus .
 - f. Hormones that is usually present in implants .
6. Which ART is best for the following situations ?
- a. Female who cannot produce egg.
 - b. Sperm does not fertilize the egg even in IVF.
 - c. Inability of a male partner to inseminate the female .
 - d. Male have very low sperm counts in the ejaculates

Holiday Home work / XII / Mathematics / 2017-18

1. IF $a_1, a_2, a_3, \dots, a_n$ are in A.P with common difference 'd' then find the value of

$$\tan \left[\tan^{-1} \left(\frac{d}{1+a_1 a_2} \right) + \tan^{-1} \left(\frac{d}{1+a_2 a_3} \right) + \tan^{-1} \left(\frac{d}{1+a_3 a_4} \right) + \dots + \tan^{-1} \left(\frac{d}{1+a_{n-1} a_n} \right) \right]$$

2. IF $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$ then prove that
 (i) $x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2} = 2xyz$
 (ii) $x^4 + y^4 + z^4 + 4x^2 y^2 z^2 = 2(x^2 y^2 + y^2 z^2 + z^2 x^2)$

3. IF $x = \tan^{-1}(2 \tan^2 x) - \frac{1}{2} \sin^{-1} \left(\frac{3 \sin 2x}{5 + 4 \cos 2x} \right)$, find general value of x .

4. solve for x : $\sin^{-1} x - \cos^{-1} x = \sin^{-1}(3x-2)$

5. solve the equation $\sin^{-1} 6x + \sin^{-1} 6\sqrt{3}x = -\pi/2$

6. Prove that $\cos^{-1} x - \cos^{-1} \left[\frac{x}{2} + \frac{\sqrt{3-3x^2}}{2} \right] = \frac{\pi}{3}$, $1/2 \leq x \leq 1$

7. Prove that $\tan(2 \tan^{-1} a) = 2 \tan(\tan^{-1} a + \tan^{-1} a^3)$

8. Prove that $4(\cot^{-1} 3 + \cos^{-1} \sqrt{5}) = \pi$

9. Simplify $\sin^{-1} \left(\frac{\sin x + \cos x}{\sqrt{2}} \right)$ $-\pi/4 < x < \pi/4$

10. Evaluate $\cos(2 \cos^{-1} x + \sin^{-1} x)$ at $x = \frac{1}{5}$
 where $0 \leq \cos^{-1} x \leq \pi$ and $-\pi/2 \leq \sin^{-1} x \leq \pi/2$

11. Show that the function $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \frac{2x-1}{3}$, $x \in \mathbb{R}$ is one-one and onto. Also find the inverse of f .

12. Let $f: \mathbb{N} \rightarrow \mathbb{R}$ be a function defined by $f(x) = 4x^2 + 12x + 15$. Show that $f: \mathbb{N} \rightarrow \text{Range}$, f is invertible. Find the inverse of f .

13. Let $A = \mathbb{Q} \times \mathbb{Q}$ where \mathbb{Q} is the set of all rational numbers and $*$ be a operation on A defined by $(a,b) * (c,d) = (ac, b+ad)$ for $(a,b), (c,d) \in A$. then find

(i) The identity element of $*$ in A .

(ii) Invertible elements of A , and hence write the inverse of element $(5,3)$ and $(\frac{1}{2}, 4)$.

14. For the matrix $A = \begin{bmatrix} 2 & 4 \\ 1 & -3 \end{bmatrix}$, verify $(A^{-1})^T = (A^T)^{-1}$

15. IF $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$, find AB , hence

Solve the system of equations $x-y=3$, $2x+3y+4z=17$ and $y+2z=7$.

16. IF $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & p & 1 \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & 2 \\ \sqrt{2} & -\frac{3}{2} & \frac{1}{2} \end{bmatrix}$, then find

the value of p and q .

17. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -1 \\ 2 & 1 & 0 \end{bmatrix}$ if it possible, using elementary row transformation.
18. If A is a square matrix such that $A^2 = A$, show that $(I+A)^3 = 7A+I$
19. If $\tan(\cos^{-1}x) = \sin(\cot^{-1}k)$, then find the value of x .
20. If $(\tan^{-1}x)^2 + (\cot^{-1}x)^2 = \frac{5\pi^2}{8}$, then find the value of x .
21. Find the inverse function of $f(x) = \frac{x-1}{x+1}$, $x \neq -1$ and verify that $f \circ f^{-1}$ is an identity function.
22. Let f and g be two real functions defined as $f(x) = 2x-3$, $g(x) = \frac{3+x}{2}$. Find $f \circ g$ and $g \circ f$.
Can you say one is inverse of other.
23. A binary operations $*$ on the set $\{0, 1, 2, 3, 4, 5\}$ is defined as

$$a * b = \begin{cases} a+b & \text{if } a+b < 6 \\ a+b-6 & \text{if } a+b \geq 6 \end{cases}$$
 Show that zero is the identity for this operation and each element a ($\neq 0$) of the set is invertible with $(6-a)$, being the inverse of a .
24. Let f be a real valued function defined by $f(x) = 4x+3$. Find the real valued function g such that $g \circ f = f \circ g = I_{\mathbb{R}}$.
25. Show that $\tan\left(\frac{1}{2} \sin^{-1} \frac{3}{4}\right) = \frac{4-\sqrt{7}}{3}$

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