

**CLASS XII A**

**HOLIDAY HOMEWORK 2023**

## ENGLISH

### **General Instructions:**

1. **Read the newspaper daily with special emphasis on school based reports, advertisements, posters and articles. Pay attention to the language used.**
2. **Attempt the following questions in English Registers.**
3. **Date of submission is 19 June,2023.**

### READING

**Q1. Read the passage and on the basis of your understanding of the passage answer the questions given below:**

1. I was only a year and some months younger than Valodya; we grew up, studied and played together. No distinction of elder and younger was made between us. But just about the time I am speaking of I began to realize that I was no companion for him, either in age, in interests or in ability. It even seemed to me that Valodya himself was aware of his superiority and was proud of it. This idea (it may have been a wrong one) was inspired by my vanity which suffered every time I came in contact with him. He was better than me in everything; at lessons, in arguments and in manners, and all this took me farther from him and caused me moral anguish which I could not understand. When Valodya was given a tucked linen shirt for the first time I was unhappy for not having a shirt like that. I am sure I would have felt happier if I was convinced that every time, he arranged his collar it was not done to annoy me.

2. What tormented me most was that it sometimes seemed to me Valodya understood what was going on inside me but tried to hide it. But perhaps my sensitiveness and tendency to analyse deceived me in this case. It may be Valodya did not feel at all as I did. He was impulsive and his enthusiasm in different hobbies did not last long.

3. He would suddenly develop a passion for pictures, himself take up painting, spend all his money buying them and beg them of his drawing master, of papa and of grandmamma. Then it would be a craze for curios to decorate his table, collecting them from every room in the house, or a mania for novels which he obtained on the sly and read all day and night. I could not help being impressed by his hobbies but I was too proud to imitate him and too young and not independent enough to choose a hobby for myself. But there was nothing I envied so much as Valodya's happy large heartedness which showed itself most strikingly when we quarrelled. I always felt that he was behaving well but I could not do likewise.

4. Once when his passion of ornaments was at its height, I went up to his table and accidentally broke an empty bright-coloured little scent bottle. “Who asked you to touch my things?” demanded Valodya coming into the room and seeing how I had upset the symmetry of the different treasures on his table. “And where is the scent bottle? You must have.....”

5. “I knocked it over by accident and it broke. What does it matter?” “Do me the favour-never dare touch my things again”, he said, putting the pieces of broken flask together and looking at them sorrowfully. “And you please don’t issue orders” I retorted, “that’s all.” And I smiled, though I did not feel in the least like smiling. “Yes, it’s nothing to you but it does matter to me,” pursued Valodya, jerking his shoulder, a gesture he had inherited from pap. “He goes and breaks it and then laughs, the nasty little brat!” “I am a little brat; and you’re big but you’re stupid.” “I am not going to quarrel with you,” said Valodya, giving me a slight push, “go away.” “Don’t push!” “Get away!” “Don’t push, I tell you!” Valodya took my word and tried to drag me away from the table; but I was beside myself by now; I got hold of the leg of the table and tipped it over. “There now!” And all his China and glass ornaments crashed to the floor. “You disgusting little boy!” cried Valodya, trying to save some of his falling treasures. “Well, now it is all over between us,” I thought as I left the room, “we have quarrelled for good.”

6. As soon as afternoon lessons were over, I left the room. I was too scared, uncomfortable and ashamed to be alone with my brother. After our history lesson in the evening, I took my exercise books and started towards the door. As I passed Valodya, though I wanted to go up to him and make friends I scowled and put on an angry expression. At that moment Valodya raised his head and, with a meaningful smile, looked me full in the face. Our eyes met and I knew that he understood me; but some irresistible feeling made me turn away.

7. “Nicky!” he said in a most natural voice without a scrap of pathos. “Don’t be cross any more. Forgive me if I offended you.” And he held out his hand. Something that came higher and higher seemed to be pressing my chest and stopping my breath but this only lasted a second; tears came to my eyes and I felt better. “Forgive....m-me, Val-dya,” I stammered, squeezing his hand. Valodya looked at me as if he could not make out at all why there should be tears in my eyes. - Leo Tolstoy

**On the basis of your reading of the above excerpt, answer the following questions briefly: -**

- (a) Why did Nicky feel that he was not an apt companion for Valodaya?
- (b) Which aspect of Valodya’s personality was Nicky most upset about?
- (c) Why did Nicky feel uncomfortable and ashamed to be alone with his brother?
- (d) What did Nicky do to show that he was sorry for all that he had done in the morning? (e) Was the narrator repentant for his behavior? How do you know?
- (f) What does Valodaya’s behavior show about his character?
- (g) **Choose the correct option:**

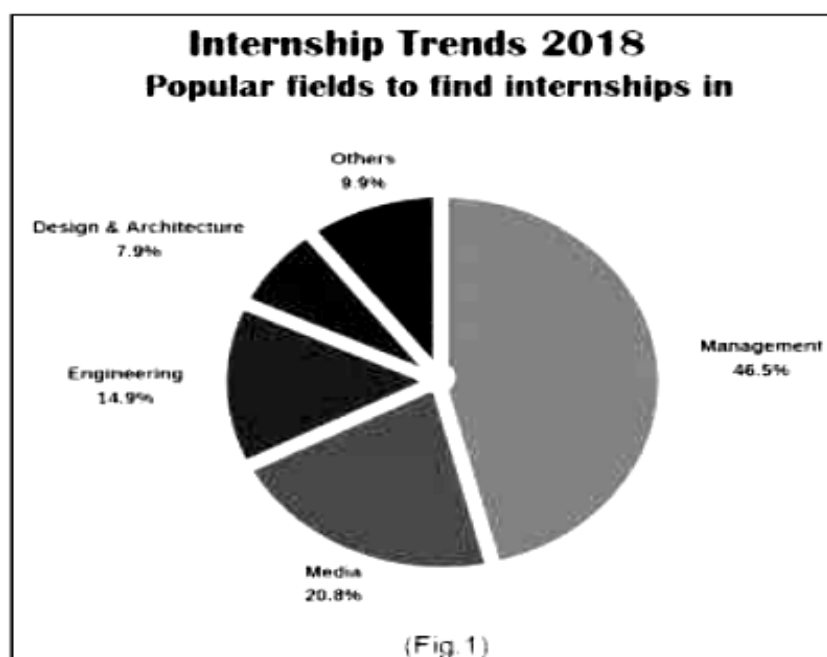
**Which of the following is NOT true for Valodaya?**

- (i) He was fond of reading.
  - (ii) He was inclined towards painting.
  - (iii) He was reckless with money.
  - (iv) He liked collecting curios and works of art.
- (h) “I am a little brat, and you’re big but you are stupid.” This line highlights that Nicky –
- (i) was disrespectful towards his brother
  - (ii) was impulsive and volatile, but loved his brother
  - (iii) was jealous of his brother
  - (iv) was unapologetic towards his brother
- (j) Give the synonym of ‘pride’ (para 1) and the antonym of ‘comforted’ (para 2)

**Q2. Read the passage and on the basis of your understanding of the passage answer the questions given below:**

I. Over the last five years, more companies have been actively looking for intern profiles, according to a 2018-19 survey by an online internship and training platform. This survey reveals that India had 80% more internship applications — with 2.2 million applications received in 2018 compared to 1.27 million in the year before. The trend was partly due to more industries looking to have fresh minds and ideas on existing projects for better productivity. What was originally seen as a western concept, getting an internship before plunging into the job market, is fast gaining momentum at Indian workplaces.

II. According to the survey data, India’s National Capital Region has been the top provider of internships, with a total of 35% internship opportunities, followed by Mumbai and Bengaluru at 20% and 15%, respectively. This includes opportunities in startups, MNCs and even government entities. The survey also revealed popular fields to find internships in (Fig.). There has been growing awareness among the students about the intern profiles sought by hiring companies that often look for people with real-time experience in management than B- school masters.



III. The stipend has been an important factor influencing the choice of internships. The survey data reveals that the average stipend offered to interns was recorded as ₹7000 while the maximum stipend went up to ₹85,000. According to statistics, a greater number of people considered virtual internships than in-office internships. Virtual internships got three times more applications than in-office, since a large chunk of students were the ones already enrolled in various courses, or preferred working from home.

IV. Internship portals have sprung up in the last three to four years and many of them already report healthy traffic per month. Reports suggest that on an average, an internship portal company has around 200,000-plus students and some 8,000 companies registered on it. It gets around two lakh visits online every month. The Managing Director of a leading executive search firm says that though these web platforms are working as an effective bridge between the industry and students, most established companies are still reluctant to take too many interns on board for obvious reasons.

**Based on your understanding of the passage, answer any six out of the eight questions by choosing the correct option.**

1. Select the correct inference with reference to the following:

Over the last five years, more companies have been actively looking for intern profiles...

- The past five years have seen active applications by interns to several companies.
- The activity for intern profiling by the companies has reached a gradual downslide over the past five years.
- There were lesser companies searching for intern profiles earlier, as compared to those in the recent five years.
- Several companies have initiated intern profiling five times a year in the recent past.

2. Select the central idea of the paragraph likely to precede paragraph I.

- Process of registering for internships
- Knowing more about internships
- Dos and Don'ts for an internship interview
- Startups and internships

3. Select the option that displays the true statement with reference to Fig 1.

- Internships for Engineering and Management are the top two favourites.
- Design & Architecture internships are significantly more popular than others.
- Internships for Media and Others have nearly equal popularity percentage.
- Management internships' popularity is more than twice that for Media.

4. Based on your reading of paragraphs II-III, select the appropriate counter-argument to the given argument.

Argument: I don't think you'll be considered for an internship just because you've been the student editor and Head of Student Council.

- I think I have a fair chance because I'm applying for a virtual position than an in-office one.

- b. I have real-time experience in managing a team and many companies consider it more meritorious than a degree in Management.
  - c. I know that my stipend might be on the lower side but I think that it's a good 'earn while you learn' opportunity.
  - d. Lot of metro-cities have a good percentage of positions open and I think I should definitely take a chance.
5. The survey statistics mention the average stipend, indicating that
- a. 50% interns were offered ₹85,000.
  - b. ₹7,000 was the lowest and ₹85,000 was the highest.
  - c. most interns were offered around ₹7,000.
  - d. No intern was offered more than ₹7,000.
6. The phrase 'healthy traffic' refers to the
- a. updates from portals about health and road safety.
  - b. statistics about adherence to traffic rules by the portals.
  - c. sizeable number of visitors to the portal per month.
  - d. monthly data about the health of internship applicants.
7. Read the two statements given below and select the option that suitably explains them.
- (1) Established companies are reluctant to take too many interns on board.
  - (2) Probability of interns leaving the company for a variety of reasons, is high.
- a. (1) is the problem and (2) is the solution for (1).
  - b. (1) is false but (2) correctly explains (1).
  - c. (1) summarises (2).
  - d. (1) is true and (2) is the reason for (1).

### WRITING

1. Choose any one of the chapters given below and make a book cover on the same, on A3 size sheet:
  - **The Last Lesson**
  - **Lost Spring**
  - **Deep Water**
  - **My Mother at Sixty-Six**
  - **The Third Level**
  - **The Tiger King**
2. Prepare an attractive poster on the theme 'Climate Change and the World in 2050'
3. **The Minister of Surface Transport and Highways, Government of India, New Delhi has invited financial and technical collaboration from well-known corporate houses for the upgrade of the existing highways and the construction of new high-tech highways and expressways.**

Write a letter to the Editor of a national daily in about 120-150 words, lauding the decision. Give reasons to support the view that this decision will tremendously improve the highway infrastructure and boost the economy through better, more comfortable, and safer movement of passengers and cargo.

4. You are Minto Mathews, the President of the School's Gardening Club. The club is organizing a drive for promoting gardening as a hobby and as environment conservation campaign. Draft a notice in about 50 words, for the school notice board, addressing the students of all classes, informing them about the drive and urging them to do their best to make it a success. Mention the proposed distribution of free saplings on the occasion and a talk on 'Useful Gardening Tips'
5. The number of women in the police force seems insufficient especially when we see the increasing involvement of women in terrorist activities. Write an article in 150-200 words for The Hindustan Chronicle, on the need of having more women in the police force.
6. **Road Safety is one of the top priorities of the government, for accidents result in the incalculable loss of lives and property. Your school recently observed a Road Safety Week in collaboration with the District Traffic Police.**  
As a student correspondent of your school magazine 'The Sentinel', write a report in 120-150 words reporting the various activities carried out by the school students during the week.  
**Including the following points in your report:**
  - Inauguration by Nilesh Shrivastav, IPS, DCP, Traffic
  - A Short Film on Road Safety
  - Road Show Road Safety Declamation Contest
  - Poster Making
  - Bicycle Rally flagged off by the School Principal
  - A Written Test on Road Signs

### LITERATURE

7. **Attempt the questions given below in 150 words each.**
  - a) "We've all a great deal to reproach ourselves with" said M.Hamel. Refer to the context and explain what he wanted to convey to his students.
  - b) Mukesh is not like the others. His dreams loom like a mirage amidst the dust of streets that fill his town Firozabad". Justify the statement in the light of contrast in the mindsets of Mukesh and the people of Firozabad.
  - c) The story 'The Tiger King' by Kalki seems to suggest that destiny is more powerful than human effort. Do you agree or disagree? Give reasons in support of your view.
  - d) Imagine the mother gets to know of the poet's fears. Write a letter, as the mother, telling the daughter why she must not dwell on these fears. (My Mother at Sixty-Six)

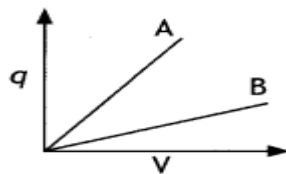
### PHYSICS

**Date of submission: 16 June, 2023**

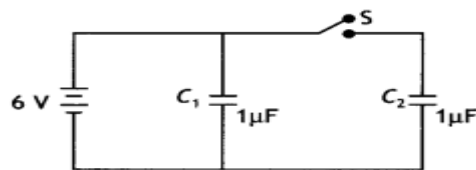
#### **I. Complete the following assignment in your physics notebook**

1. A hollow metal sphere of radius 5 cm is charged such that the potential on its surface is 10 V. What is the potential at the centre of the sphere?

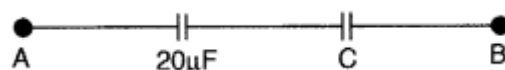
2. The given graph shows the variation of charge 'q' versus potential difference 'V' for two capacitors  $C_1$  and  $C_2$ . Both the capacitors have the same plate separation but the plate area of  $C_2$  is greater than that of  $C_1$ . Which line (A or B) corresponds to  $C_1$  and why?



3. Does the charge given to a metallic sphere depend on whether it is hollow or solid?
4. The figure shows two identical capacitors,  $C_1$  and  $C_2$ , each of  $1\ \mu\text{F}$  capacitance connected to a battery of  $6\ \text{V}$ . Initially switch 'S' is closed. After some time 'S' is left open and dielectric slabs of dielectric constant  $K = 3$  are inserted to fill completely the space between the plates of the two capacitors. How will (i) the charge and (ii) potential difference between the plates of the capacitors be affected after the slabs are inserted?



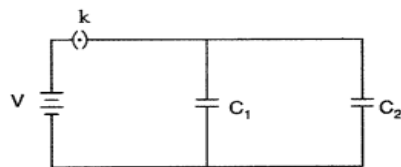
5. A particle, having a charge  $+5\ \mu\text{C}$ , is initially at rest at the point  $x = 30\ \text{cm}$  on the  $x$  axis. The particle begins to move due to the presence of a charge  $Q$  that is kept fixed at the origin. Find the kinetic energy of the particle at the instant it has moved  $15\ \text{cm}$  from its initial position if (i)  $Q = +15\ \mu\text{C}$  and (ii)  $Q = -15\ \mu\text{C}$
6. Two identical capacitors of  $12\ \text{pF}$  each are connected in series across a battery of  $50\ \text{V}$ . How much electrostatic energy is stored in the combination? If these were connected in parallel across the same battery, how much energy will be stored in the combination now? Also, find the charge drawn from the battery in each case.
7. Two uniformly large parallel thin plates having charge densities  $+\sigma$  and  $-\sigma$  are kept in the  $X$ - $Z$  plane at a distance ' $d$ ' apart. Sketch an equipotential surface due to electric field between the plates. If a particle of mass ' $m$ ' and charge ' $q$ ' remains stationary between the plates, what is the magnitude and direction of this field?
8. Two small identical electrical dipoles  $AB$  and  $CD$ , each of dipole moment ' $p$ ' are kept at an angle of  $120^\circ$ . What is the resultant dipole moment of this combination? If this system is subjected to electric field ( $\vec{E}$ ) directed along  $+X$  direction, what will be the magnitude and direction of the torque acting on this?
9. Plot a graph showing the variation of current density ( $j$ ) versus the electric field ( $E$ ) for two conductors of different materials. What information from this plot regarding the properties of the conducting material, can be obtained which can be used to select suitable materials for use in making (i) standard resistance and (ii) connecting wires in electric circuits?
10. The equivalent capacitance of the combination between A and B in the given figure is  $4\ \mu\text{F}$ .



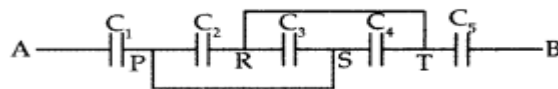
- (i) Calculate capacitance of the capacitor C.
- (ii) Calculate charge on each capacitor if a  $12\ \text{V}$  battery is connected across terminals A and B.
- (iii) What will be the potential drop across each capacitor?
11. Two parallel plate X and Y capacitors, X and Y, have the same area of plates and same separation between them. X has air between the plates while Y contains a dielectric medium of

$\epsilon_r = 4.$

- (i) Calculate capacitance of each capacitor if equivalent capacitance of the combination is  $4 \mu\text{F}$ .
  - (ii) Calculate the potential difference between the plates of X and Y.
  - (iii) What is the ratio of electrostatic energy stored in X and Y?
12. Two parallel plate capacitors of capacitances  $C_1$  and  $C_2$  such that  $C_1 = 3C_2$  are connected across a battery of  $V$  volts as shown in the figure. Initially the key (k) is kept closed to fully charge the capacitors. The key is now thrown open and a dielectric slab of dielectric constant 'K' is inserted in the two capacitors to completely fill the gap between the plates, Find the ratio of
- (i) the net capacitance and
  - (ii) the energies stored in the combination, before and after the introduction of the dielectric slab

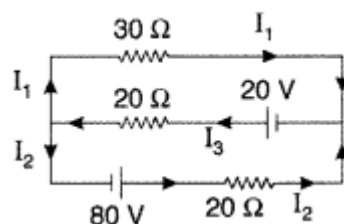


13. (i) Find equivalent capacitance between A and B in the combination given below. Each capacitor is of  $2 \mu\text{F}$  capacitance



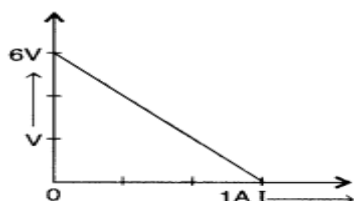
- (ii) If a DC source of  $7 \text{ V}$  is connected across AB, how much charge is drawn from the source and what is the energy stored in the network?
14. Two metallic wires of the same material have the same length but cross-sectional area is in the ratio  $1:2$ . They are connected
- (i) in series and
  - (ii) in parallel.
- Compare the drift velocities of electrons in the two wires in both the cases (i) and (ii)

15. Use Kirchhoff's rules to determine the value of the current  $I_1$  flowing in the circuit shown in the figure.

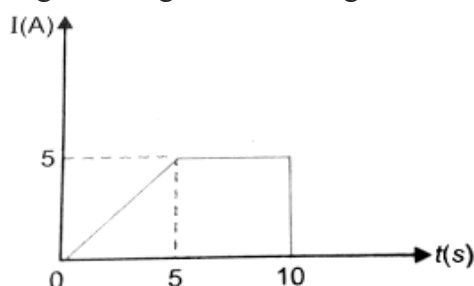




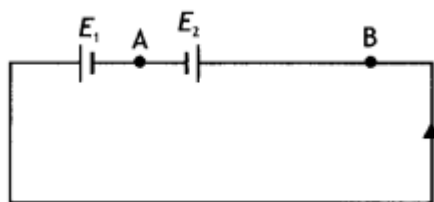
16. The plot of the variation of potential difference  $A$  across a combination of three identical cells in series, versus current is shown along the question. What is the emf and internal resistance of each cell?



17. Two wires of equal length, one of copper and the other of manganin have the same resistance. Which wire is thicker?
18. Draw a graph showing the variation of resistivity with temperature for nichrome. Which property of nichrome is used to make standard resistance coils?
19. Figure shows a plot of current 'I' flowing through the cross-section of a wire versus the time 't'. Use the plot to find the charge flowing in 10 s through the wire.



20. The circuit in the figure shows two cells connected in opposition to each other. Cell  $E_1$  is of emf 6 V and internal resistance  $2 \Omega$ ; the cell  $E_2$  is of emf 4 V and internal resistance  $8 \Omega$ . Find the potential difference between the points A and B.



**II. Note down the following activities from your lab manual in your activity file, with relevant diagrams to be drawn on the blank side.**

1. To assemble the components of a given electrical circuit.
2. To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.
3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.
4. To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.

5. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
6. To study the nature and size of the image formed by a convex lens, on a screen by using a candle and a screen (for different distances of the candle from the l

## CHEMISTRY

**Date of submission: 20 June 2023**

**I Complete the Project work.**

**II Complete the following assignment in your Chemistry register.**

1. Why is thionyl chloride process the best method to prepare alkyl chlorides from alcohols?
2. What is the role of acetone in Finkelstein reaction?
3. Give the order of reactivity of the following towards  $S_N1$  mechanism:
  - a) RI, RCl, RBr
  - b)  $CH_3CH_2Br$ ,  $(CH_3)_2CHBr$ ,  $(CH_3)_3Br$
  - c) Vinylic chloride, Benzylic chloride, Chlorobenzene, Allylic chloride
4. Halo alkanes with KCN form alkyl cyanides while AgCN will give alkyl isocyanide as major product. Why?
5. What is a chiral carbon? Why does  $S_N1$  give a racemic mixture whereas  $S_N2$  gives inverted product?
6. How can you convert aniline into Iodobenzene?
7. Why do aryl halides not undergo nucleophilic substitution?
8. Why is X group in aryl halides ortho- para directing but deactivating for electrophilic substitution?
9. p-Nitrochlorobenzene undergoes nucleophilic substitution more easily than Chloro benzene. Why?
10. Give a chemical test to distinguish between the following pairs of compounds:
  - chloroethane and bromoethane
  - chloroethane and chlorobenzene
11. What is phosgene gas?
12. Carry out the following conversions:
  - (i) Butane to 2-Nitrobutane
  - (ii) But-1ene to But-2ene
  - (iii) 1-Bromoethane to Butane
  - (iv) Chlorobenzene to p-Nitrophenol
  - (v) Propanol to Butane nitrile

- (vi) Ethane to Ethene  
(vii) Ethene to Ethyne
13. Ibrahim collected a 10mL each of fresh water and ocean water. He observed that one sample labeled “P” froze at 0 °C while the other “Q” at -1.3°C. Ibrahim forgot which of the two, “P” or “Q” was ocean water. Help him identify which container contains ocean water, giving rationalization for your answer.
14. A 5% solution of  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$  ( $\text{MW} = 322 \text{ gmol}^{-1}$ ) is isotonic with 2% solution of non-electrolytic, non volatile substance X. Find out the molecular weight of X.
15. If relative decrease in vapour pressure is 0.4 for a solution containing 1 mol NaCl in 3 mol of  $\text{H}_2\text{O}$ , then what will be the %ionization of NaCl?
16. When 2.56 g of sulphur was dissolved in 100 g of  $\text{CS}_2$ , the freezing point lowered by 0.383 K. Calculate the formula of sulphur ( $\text{S}_x$ ). ( $K_f$  for  $\text{CS}_2 = 3.83 \text{ K kg mol}^{-1}$ , Atomic mass of sulphur =  $32 \text{ g mol}^{-1}$ ]
17. If  $\text{O}_2$  gas is bubbled through water at 293 K, how many moles of  $\text{O}_2$  gas would dissolve in 1 L of water? Assume that  $\text{O}_2$  gas exerts a partial pressure of 0.823 bar. Given that the Henry’s law constant for  $\text{O}_2$  at 293 K is 34.86 kbar.

## BIOLOGY

**Date of submission: 21 June 2023**

- You are required to make mind maps on the following topics given below.
  - Microsporogenesis and megasporogenesis
  - Mendelian and chromosomal disorders
- Complete the NCERT back exercise questions of
  - Reproductive Health
  - Heredity and variation
- Solve the NCERT exemplar questions of the following chapters-
  - Sexual reproduction in flowering plants
  - Human reproduction
  - Heredity and variation
- Complete the practical file and write the following experiments:
  - 1.Prepare a temporary mount to observe pollen germination.
  - 2.Prepare a temporary mount of onion root tip to study mitosis.
  - 5.Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.
  - Flowers adapted to pollination by different agencies (wind, insects, birds).
  - Pollen germination on stigma through a permanent slide or scanning electron micrograph.
  - Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
  - Meiosis in onion bud cell or grasshopper testis through permanent slides.
  - T.S. of blastula through permanent slides (Mammalian).
  - Common disease-causing organisms like Ascaris, Entamoeba, Plasmodium, any fungus causing ringworm through permanent slides, models or virtual images or specimens. Comment on symptoms of diseases that they cause (spotting).

## MATHEMATICS

**Date of submission: 23 June 2023**

**Complete the following assignment in Mathematics notebook.**

1. Give an example of a 3 x 3 matrix which is
  - (a) Symmetric Matrix
  - (b) Skew-Symmetric Matrix
  - (c) Neither Symmetric nor Skew-Symmetric Matrix
  - (d) Symmetric as well as Skew-Symmetric Matrix
2. If  $f(x) = \frac{1}{\sqrt{1-x^2}} \begin{bmatrix} 1 & -x \\ -x & 1 \end{bmatrix}$  then prove that  $f(x).f(y) = f\left(\frac{x+y}{1+xy}\right)$ . Hence show that  $f(x).f(-x) = 1$ , where  $|x| < 1$ .
3. If order of Matrix A be  $m \times n$ , then what will be the order of matrix B if
  - (a)  $AB$  &  $BA$  both are defined
  - (b)  $AB'$  &  $B'A$  both are defined
4. Find the matrix A, if  $\begin{pmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{pmatrix} A = \begin{pmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{pmatrix}$ .
5. If  $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$  find  $A^2 - 5A + 4I$  and hence find a matrix X such that  $A^2 - 5A + 4I + X = O$
6. Prove that the function defined by  $f : \mathbb{N} \rightarrow \mathbb{N}$  defined by  $f(x) = x^2 + x + 1$  is one-one but not onto.
7. Prove that  $\cos[\tan^{-1}\{\sin(\cot^{-1}x)\}] = \sqrt{\frac{1+x^2}{2+x^2}}$   
 If  $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$  be such that  $A^{-1} = kA$ , then find the value of k.
9. If  $A^{-1} = \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 3 \\ -1 & 1 \end{bmatrix}$ , write the value of  $\det(AB)$ .
10. Find the values of x, y and z if  $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$  satisfies  $A' = A^{-1}$
11. Differentiate:  $\sin^2(x^2)$  w.r.t  $x^2$ .
12. If  $x = a \cos \theta + b \sin \theta, y = a \sin \theta - b \cos \theta$ , show that  $y^2.y'' - x.y' + y = 0$ .
13. If  $(x - y) \cdot e^{\frac{x}{x-y}} = a$ , prove that  $y.y' + x = 2y$ .
14. If  $x = a \sin 2t (1 + \cos 2t)$  and  $y = b \cos 2t (1 - \cos 2t)$ , find the values of  $dy/dx$  at  $t = \pi/3$

and  $t = \pi/4$

15. If  $x^m \cdot y^n = (x + y)^{m+n}$ . then prove that  $y'' = 0$
16. If  $y = x^x$ , then prove that  $\frac{d^2y}{dx^2} - \frac{1}{y} \cdot \left(\frac{dy}{dx}\right)^2 - \frac{y}{x} = 0$
17. If  $y = \log(1 + t^2 + t^4)$  and  $x = \tan^{-1} t$ , find  $\frac{d^2y}{dx^2}$
18. If  $y = \frac{x \cos^{-1} x}{\sqrt{1-x^2}} - \log \sqrt{1-x^2}$  then prove that  $y_1 = \frac{\cos^{-1} x}{(1-x^2)^{3/2}}$
19. If  $x = a(\cos 2\theta + 2\theta \sin 2\theta)$  and  $y = a(\sin 2\theta - 2\theta \cos 2\theta)$ . Find  $\frac{d^2y}{dx^2}$  at  $\theta = \pi/8$
20. If  $y = \sin(\sin x)$ , prove that  $y'' + \tan x \cdot y' + y \cdot \cos^2 x = 0$
21. Differentiate the function  $(\sin x)^x + \sin^{-1} \sqrt{x}$  with respect to  $x$ .
22. If  $y = \log(x + \sqrt{x^2 + a^2})$ ,  
Then prove that  $(x^2 + a^2)y_2 + x \cdot y_1 = 0$
23. Prove that the greatest integer function defined by  $f(x) = [x]$ ,  $0 < x < 3$  is not differentiable at  $x=1$ .
24. Let  $A = \{1,2,3, \dots, 9\}$  and  $R$  be a relation on  $A \times A$  defined by  $R = \{(a, b): |a - b| \text{ is even}\}$  is an equivalence relation. Also find the equivalence class of 7.
25. If  $f(x) = \begin{cases} \frac{\sin(a+1)x + 2\sin x}{x}, & x < 0 \\ 2, & x = 0 \\ \frac{\sqrt{1+bx}-1}{x}, & x > 0 \end{cases}$  is continuous at  $x = 0$  then find the value of  $a$  and  $b$ .
26. Sherlin and Dhanuja are playing Ludo at home during Covid-19. While rolling the dice, Sherlin's sister Raji observed and noted the possible outcomes of the throw every time belongs to set  $\{1,2,3,4,5,6\}$ . Let  $A$  be the set of players while  $B$  be the set of all possible outcomes.  
 $A = \{S, D\}$ ,  $B = \{1,2,3,4,5,6\}$
- (a) Let  $R : B \rightarrow B$  be defined by  $R = \{(x, y): y \text{ is divisible by } x\}$  is
- Reflexive and transitive but not symmetric
  - Reflexive and symmetric and not transitive
  - Not reflexive but symmetric and transitive
  - Equivalence
- (b) Raji wants to know the number of functions from  $A$  to  $B$ . How many number of functions are possible?
- $6^2$
  - $2^6$
  - $6!$
  - $2^{12}$
- (c) Let  $R$  be a relation on  $B$  defined by  $R = \{(1,2), (2,2), (1,3), (3,4), (3,1), (4,3), (5,5)\}$ . Then  $R$  is
- Symmetric
  - Reflexive
  - Transitive
  - None of these
- (d) Raji wants to know the number of relations possible from  $A$  to  $B$ . How many numbers of relations are possible?
- $6^2$
  - $2^6$
  - $6!$
  - $2^{12}$
- (e) Let  $R : B \rightarrow B$  be defined by  $R = \{(1,1), (1,2), (2,2), (3,3), (4,4), (5,5), (6,6)\}$ , then  $R$  is

- (i) Symmetric
- (ii) Reflexive and Transitive
- (iii) Transitive and symmetric
- (iv) Equivalence
- (v)

27. On her birth day, Seema decided to donate some money to children of an orphanage home. If there were 8 children less, everyone would have got 10 more. However, if there were 16 children more, everyone would have got Rs. 10 less. Let the number of children be  $x$  and the amount distributed by Seema for one child be  $y$  (in Rs.)

Based on the information given above, answer the following questions:

(a) The equations in terms  $x$  and  $y$  are

- (i)  $5x-4y = 40$  ,  $5x-8y = -80$
- (ii)  $5x-4y = 40$   $5x-8y = 80$
- (iii)  $5x-4y = 40$   $5x+8y = -80$
- (iv)  $5x+4y = 40$   $5x-8y = -80$

(b) Which of the following matrix equations represent the information given above?

- (i)  $\begin{bmatrix} 5 & 4 \\ 5 & 8 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 40 \\ -80 \end{bmatrix}$
- (ii)  $\begin{bmatrix} 5 & -4 \\ 5 & -8 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 40 \\ 80 \end{bmatrix}$
- (iii)  $\begin{bmatrix} 5 & -4 \\ 5 & -8 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 40 \\ -80 \end{bmatrix}$
- (iv)  $\begin{bmatrix} 5 & 4 \\ 5 & -8 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 40 \\ -80 \end{bmatrix}$

(c) The number of children who were given some money by Seema, is

- (i) 30
- (ii) 40
- (iii) 23
- (iv) 32

(d) How much amount is given to each child by Seema?

- (i) ₹ 32
- (ii) ₹ 30
- (iii) ₹ 62
- (iv) ₹ 26

(e) How much amount Seema spends in distributing the money to all the students of the Orphanage?

- (i) ₹ 609
- (ii) ₹ 960
- (iii) ₹ 906
- (iv) ₹ 690

## COMPUTER SCIENCE

**Date of Submission:** 26 June, 2023

**GENERAL INSTRUCTIONS:**

- Code for the following programs to be printed on A4 size sheets along with the snapshot of the output
  - Font for the Code: Courier New: Font-size – 12
  - Only one program and its output to be printed on one A4 size sheet
1. Write a program to check if the given number (positive Integer) is prime or not.
  2. Write a program to reverse a given string
    - a. Using iterative statements in Python
    - b. Using Slicing Method in Python
  3. Write a program to remove all odd numbers from a given list (without using Python in-built functions)
  4. Write a program to find and display the sum of all the integers (positive/negative) that have 3 in the units place in a tuple.
  5. Write a Python program to create and print a dictionary where the keys are numbers between 1 and n (both included); when n is given by the user and the corresponding values are the square of the keys.
  6. Write a program in Python to use standard library- Math and perform the following-
    - a. Find the Area of a circle
    - b. Find the square root of a given number
  7. Write program in Python to find the area of- circle, square, rectangle, trapezium, sphere and cylinder with the help of user defined functions
  8. Write a menu-driven program in Python to create a calculator with the help of user defined functions
  9. Write a user defined function that takes a given number as an input argument and returns the Fibonacci series upto the given number from the function.
  10. Write a function EOReplace() in Python, which accepts a list L of numbers. The function returns the list after incrementing all numbers with 3 in the units place by 1 and decrementing all numbers with 5 in the units place by 1.

## PHYSICAL EDUCATION

**Date of submission: 23 June 2023**

### **To be done in Record/Practical File.**

- I. Practical-1: Fitness test administration for all items.
- II. Practical-2: Procedure for Asanas, benefits & contraindication for any two Asanas for each lifestyle disease.
- III. Practical-3: Procedure for administering Senior Citizen Fitness Test for 5 elderly family members.
- IV. Practical-4: Any one game of the student's choice from the list below. Labelled diagram of field & equipment (Rules, Terminologies & Skills) of the same game.  
Basketball, Football, Kabaddi, Kho-Kho, Volleyball, Handball, Hockey, Cricket, Bocce & Unified Basketball (CWSN).
  - Record File should be of the new pattern.

### **Assignment**

**Complete the following assignment in P.ED notebook.**

1. Write about the objectives of intramural tournaments.
2. Discuss a method you would choose to spread health awareness and harmony in your area.  
Support your answer with reasons.
3. Describe corrective measures for some common spinal postural deformities.
4. Write down the procedure and contraindications of Matsyasana in detail.
5. Discuss different types of tournaments.
6. Explain various benefits of Women's participation in Sports.