

## HALF YEARLY

### CLASS – XII

### PHYSICS

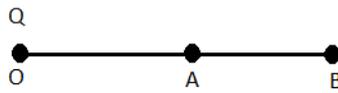
**Time allowed: 3 hours**

**M.M:70**

#### **GENERAL INSTRUCTIONS**

- All questions are compulsory.
  - Questions 1 to 20 carries 1 mark each
  - Questions 21 to 27 carries 2 marks each
  - Questions 28 to 34 carries 3 marks each
  - Questions 35 to 37 carries 5 marks each
1. Is it possible that the potential at a point is zero, while there is finite electric field intensity at that point? Give an example.
  2. Can two equipotential surfaces intersect? Justify your answer.
  3. Is potential gradient a vector or a scalar quantity?
  4. Write the dimensional formula of ' $\epsilon_0$ ' the permittivity of free space.
  5. Define the term 'mobility' of charge carrier. Write its S.I. unit.
  6. Name the physical quantity whose SI unit is J/C. Is it a scalar or vector quantity?
  7. State the condition in which terminal voltage across a secondary cell is equal to its emf.
  8. If the radius of a copper wire is doubled, will its specific resistance increase, decrease or remain same ?
  9. An electron beam is moving vertically upwards. If it passes through a magnetic field directed from South to North in a horizontal plane, in what direction will the beam be deflected?
  10. What is the work done by the magnetic force on a charged particle moving perpendicular to the magnetic field?
  11. A cyclotron is not suitable to accelerate electron. Why?
  12. Define solenoid?
  13. State Lenz law?
  14. A conducting wire is kept along the N→S direction and is allowed to fall freely. Will an e.m.f be induced in the wire?
  15. What are eddy currents?
  16. Write the SI unit of displacement current?

17. Can the velocity of light in vacuum be changed?
18. A substance has critical angle of  $45^\circ$  for yellow light. What is its refractive index?
19. Show the variation of  $u$  and  $v$  in case of a convex mirror?
20. State the condition that must be satisfied for two light sources to be coherent?
21. The amplitude of  $\vec{B}$  of harmonic electromagnetic wave in vacuum is  $B_0 = 510$  nT. What is the amplitude of the electric field part of the wave?
22. How does a charge  $q$  oscillating at certain frequency produce electromagnetic wave?
23. The velocity of light in flint glass for wavelengths 400nm and 700nm are  $1.80 \times 10^8$  m/s and  $1.86 \times 10^8$  m/s respectively. Find the minimum angle of deviation of an equilateral prism made of flint glass for the given wavelengths.
24. When a voltage of 120V is given to the primary of a transformer the current in the primary is 1.85mA. Find the voltage across the secondary when it gives a current of 150mA. The efficiency of the transformer is 95% .
25. What is the significance of Gauss's law in magnetism?
26. How will you connect seven capacitors of  $2\mu\text{f}$  each to obtain an effective capacitance of  $10/11 \mu\text{f}$ .
27. Two point charges  $3 \times 10^{-8}$  C and  $-2 \times 10^{-8}$  C are located 15 cm apart in air. Find at what point on the line joining these charges the electric potential is zero. Take potential at infinity to be zero.
28. Two circular loops are placed with their centres at fixed distance apart. How would you orient the loops to have (i) maximum (ii) minimum Mutual inductance?
29. Obtain an expression for the self inductance of a solenoid? Hence define one Henry?
30. Find the wavelength of electromagnetic waves of frequency  $6 \times 10^{12}$  Hz in free space. Give two applications of the type of wave.
31. A Galvanometer of resistance 3663 ohm gives full scale deflection for a certain current  $I_g$ . Calculate the value of the resistance of the shunt which when joined to the galvanometer coil will result in  $1/34$  of the total current passing through the galvanometer. Also find the total resistance of the Galvanometer and shunt.
32. The susceptibility of a magnetic material is 0.9853. Identify the type of the magnetic material. Draw the modification of the field pattern on keeping a piece of this material in a uniform magnetic field.
33. Deduce ohm's law using the concept of drift velocity.
34. A point charge  $Q$  is placed at point  $O$  as shown. Is the potential difference ( $V_A - V_B$ ) positive, negative or zero if  $Q$  is (i) positive (ii) negative



- 35.(a) Show that the potential of a charged spherical conductor, kept at the centre of a charged hollow spherical conductor is always greater than that of the hollow spherical conductor, irrespective of the charge accumulated on it.  
 (b) Prove that net energy stored across the series combination of three capacitors remains same to that in parallel combination of the same three capacitor connected to the same source of Potential.
36. Answer the following questions:
- (a) The angle subtended at the eye by an object is equal to the angle subtended at the eye by the virtual image produced by a magnifying glass. In what sense does a magnifying glass provide angular magnification?
- (b) In viewing through a magnifying glass, one usually positions one's eyes very close to the lens. Does angular magnification change if the eye is moved back?
- (c) Magnifying power of a simple microscope is inversely proportional to the focal length of the lens. What then stops us from using a convex lens of smaller and smaller focal length and achieving greater and greater magnifying power?
- (d) Why must both the objective and the eye piece of a compound microscope have short focal lengths?
- (e) When viewing through a compound microscope, our eyes should be positioned not on the eyepiece but a short distance away from it for best viewing .Why?
37. (a) State Huygen's principle for constructing wavefronts?  
 (b) Using Huygen's principle deduce the laws of reflection of light?

**HALF YEARLY SAMPLE PAPER**

**CLASS – XII (2019-20)**

**PHYSICAL EDUCATION(048)**

**TIME: 3 Hrs.**

**M.M: 70**

**General Instructions:**

- The question paper consists of 26 questions.
- All questions are compulsory.
- Q1 to Q11 are of 1 mark each must be answered in 10 to 20 words.
- Q 12 to 19 are of 3 marks each must be answered in 30 to 50 words.
- Q 20 to 26 are of 5 marks each must be answered in 75 to 100 words.

**Section-A**

Q1 What do you understand by seeding?

Q2 Enlist two sources for calcium and iron separately.

Q3 Which test would you suggest for your grandmother to test lower body flexibility?

Q4 What is oxygen uptake?

OR

What is health run?

Q5 What kind of sports injury can be termed as abrasion?

Q6 What do you mean by single league tournament?

OR

What is Asthma?

Q7 What is food intolerance?

Q8 What do you mean by Diabetes?

OR

What is roughage?

Q9 What do you mean by sensory processing disorder?

Q10 What do you mean by ageing?

OR

What is hypertension?

Q11 What do you mean by senior citizen test?

### **Section-B**

Q12 Explain the combination tournament in brief.

OR

Mention any five benefits of Chakrasana.

Q13 Suresh was an intelligent student of our class but he was suffering from kyphosis which is one of the major deformities of spine. Most of the students used to laugh at him and passed indecent comments on him. Owing to that, he remained under tension and stress. One day, our teacher came to know about his problem. He rebuked the children for their misdeeds and suggested them not to repeat such things in future. He advised Suresh to take some corrective exercises to treat the deformity caused by kyphosis. After performing corrective exercise for some months, he has got rid of kyphosis.

On the basis of the above passage, answer the following questions:

- (i) Comment upon the qualities of students of the class.
- (ii) Discuss the values possessed by the teacher.
- (iii) Mention some corrective exercises as remedy for kyphosis.

Q14 Mention the benefits of Shavasana.

OR

Elucidate the need of food supplement for children.

Q15 Mention the corrective measures related to kyphosis.

Q16 Discuss the causes of ASD.

Q17 Discuss any three psychological traits of women athletes.

Q18 How can the minimum muscular strength for children be assessed?

OR

Enlist two objectives of intramurals.

Q19 Elaborate the effects of ageing on bone density.

### **Section-C**

Q20 Elaborate the prevention of sports injuries.

Q21 What do you mean by obesity? Discuss the benefits and contraindications of Pada Hastasana and Vajrasana.

Q22 What do you mean by food supplement ? Describe the precautions for taking food supplements.

OR

What do you mean by Back pain? Discuss the procedure and benefits of Shalabhasana.

Q23 Discuss the objectives of extramurals in detail.

Q24 Explain the arm curl test for measuring upper body strength.

Q25 Explain any five common postural deformities.

Q26 Discuss in detail about female athlete triad.

OR

Discuss how five major components of diet can enhance the performance of a sportsperson.

# HALF YEARLY EXAMINATION

## CLASS- XII A

### SUBJECT – BIOLOGY

**Time : 3 Hrs**

**M.M: 70**

#### **General Instructions :**

- All questions are compulsory.
- Question numbers 1 to 5 are very short answer type questions, each of 1 mark.
- Question numbers 6 to 12 are short answer questions of 2 marks each.
- Question numbers 13 to 24 are also short answer questions of 3 marks each.
- Question numbers 25 to 27 are long answer questions of 5 marks each.

Q1. What is the major difference you observe in the offsprings produced by asexual reproduction and in the progeny produced by sexual reproduction?

Q2. A bilobed, dithecous anther has 100 microspore mother cells per microsporangium. How many male gametophyte can it produce?

Q3. Write the full name of the following terms:

- i. STD
- ii. MTP

Q4. What is the units of heredity?

Q5. Name two microbes used as biopesticides.

#### **SECTION B**

Q 6. Write the possible genotype for the blood group A & B.

Q 7. The cell division involved in gamete formation is not of the same type in different organisms. Justify.

Q 8. What is meant by germplasm collection? what are its benefits?

Q 9. Explain the function of 'anaerobic sludge digester' in a sewage treatment plant.

- Q 10. Name the source of the DNA polymerase used in PCR technique. Mention why it is used .
- Q 11. Describe lactational amenorrhea method of birth control?
- Q 12. Mention the pollinating agent of an inflorescence of small dull coloured flowers with well exposed stamens and large feathery stigma. Give any one characteristic of pollen grains produced by such flowers.
- Q 13. A young boy when brought a pet dog home started to complain of watery eyes and running nose. The symptoms disappeared when the boy was kept away from the pet.
- (a) Name the type of antibody and the chemicals responsible for such a response in the body.
  - (b) Mention the name of any drug that could be given to the boy for immediate relief from such a response

### **SECTION C**

- Q 14. Name a disorder, give the karyotype and write the symptoms where a human male suffers as a result of an additional X-chromosome.
- Q 15. What do you mean by speciation? Name different form of speciation.
- Q 16. Name the type of human cell HIV attacks on its entry into the body. Explain the events that occur in the cell which further lead to cause immunodeficiency syndrome.
- Q 17. DNA being hydrophilic cannot pass through the cell membrane of a host cell. Explain how does recombinant DNA get introduced into the host cell to transfer the later.
- Q 18. Explain mechanical methods of birth control.
- Q 19. Distinguish between (a) spermatogenesis and spermiogenesis. (b) corona radiate and zona pellucida.
- Q 20. Does self incompatibility impose any restriction on autogamy? Give reasons and suggest the method of pollination in such plants.
- Q 21. What is “Biofortification “? write its importance . Mention the contribution of Indian Agricultural Research Institute towards it with the help of two examples?

Q 22. (a) Name and explain giving reasons the type of immunity provided to the new born by colostrum and vaccinations.

(b) Name the type of antibody

i. I. Present in colostrum

ii. II. Produced in response to allergens in human body .

Q23.i) Identify a, b,c,d , e and f in the table given below

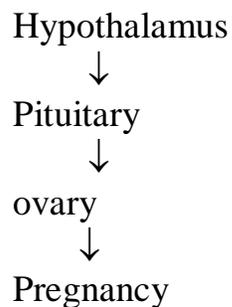
Scientific Name of the organism	Product produced	Use in human welfare
<i>Streptococcus</i>	Streptokinase that was later modified	a
b	Cyclosporin A	c
<i>Monascus purpureus</i>	d	e
<i>Lactobacillus</i>	f	Sets milk into curd

Q 24. Branching descent and natural evolution are the two key concepts of Darwinian Theory of evolution. Explain each concept with the help of a suitable example.

### SECTION D

Q 25. Describe in sequence the events that lead to the development of a 2-celled pollen grain from microspore mother cell in angiosperms.

Q 26. Study the following flow chart. Name the hormones involved at each stage. Explain their functions.



Q 27. Discuss the process of transcription in detail.

**SAMPLE PAPER**  
**EXAM – HALF YEARLY**  
**CLASS – XII**  
**SUBJECT-ENGLISH**

**TIME: 3 HOURS**

**M.M – 100**

**GENERAL INSTRUCTIONS-**

1. This paper is divided into three sections: A, B and C. All the sections are compulsory.
2. Separate instructions are given with each section and question, wherever necessary.
3. Read these instructions very carefully and follow them.
4. Do not exceed the prescribed word limit while answering the questions.

**SECTION- A (READING) (20marks)**

**Q1. Read the following poem carefully. 12M**

1. India has never subscribed to the doctrine of militarism and war in her history. Here war was never treated as an ideal. It was only tolerated as unavoidable and inevitable, and all attempts were made to check it and bring it under control. In spite of the frequency of wars in ancient India, in spite of highly developed military organization, techniques of war and imperialism, and in spite of the open justification of war as national policy, the heart of India loved pacifisms as an ideal capable of realization. India's symbolic role was that of a peacemaker and it sincerely pinned its faith on the principle of "Live and let live". At least philosophically, India's intelligence supported the cause of peace not only in national affairs but in international affairs also. All the great seers of the yore visualized the unity of life, permeating all beings, animate or inanimate, which ruled out killing and suicidal wars.
2. This doctrine of philosophical pacifisms was practiced by ancient Aryans is, no doubt, a question of controversial nature. Certainly, the great Indian teachers and savants stuck to this doctrine tenaciously and in their personal life they translated it into practice and preached it to masses and even to princes of military classes.
3. Another culture of those times, the existence of which has been proved by the excavations of Mohanjo-Daro, also enunciated the doctrine of pacificism and friendship to all. Strangely enough, the Indus Valley civilization has revealed no fortification and very few weapons.
4. Ahimsa or the doctrine of non-violence in thought, speech and action assumed a gigantic importance in the Buddhist and Jain period. By a constant practice of this virtue, man becomes unassailable by even wild beasts, who forgot their ferocity the moment they entered the circumference of his magnetic influence. The monks and nuns of these churches were apostles of peace, who reached every nook and corner

of the world and delivered the message of love to war-weary humanity. The greatest votary was the royal monk Ashoka, who in reality was responsible for transforming Ahimsa as an act of personal virtue, to Ahimsa as an act of national virtue. 2

5. Many a historian recounting the causes of the downfall of the Mauryas, hold the pacific policy of Ashoka which had eschewed the aggressive militarism of his predecessors, responsible for an early decay of the military strength of the state and its consequent disintegration, leading to the rise of Sungas, Kanvas and Andhras. But, in reality the fault lies with the weak successors of Ashoka, who could not wield the weapon of non-violence with a skill and efficiency which required the strength of a spiritual giant like Ashoka. They failed due to their subjective weakness: Pacifism itself was no cause of their failure.

6. Besides the foregoing philosophical and religious school of thought, even many political authorities gave their unqualified support to the cause of pacifisms. They recognized the right of rivals to exist, not mainly as enemies, but as collaborators in the building of a civilization operation. Thus, for centuries, in the pre-Mauryan India, scores of small independent republics existed and flourished without coming in clash with each other.

7. With regard to Kautilya, the much maligned militarist and the so called Machiavelli of India, He thinks that the object of diplomacy is to avoid war.

8. The Mahabharata observes in the connection, "A wise man should be content with what can be obtained by the expedients of conciliation, gift and dissention." It denounces the warring world of men by comparing it to a dog-kennel. "First there comes the wagging of tails, then turning of one round to other, then the show of teeth, then the roaring and then comes the commencement of the fights. It is the same with men; there is no difference whatever." Yajnavalkya adds: „War is the last expedient to be used when all others have failed." Likewise, Sri Krishna who's Bhagwad-Gita has been styled by some as „a song of the battle", should not be considered out and out militarist. When all the three expedients were exhausted, then alone the fourth was resorted to.

9. All possible avenues of peace such as negotiation, conciliation through conference, meditation and so on, were explored before the war was resorted to. This proves that the heart of ancient India was sound and it longed for peace, although war also was not treated as an anathema, which was to be avoided as far as possible.

**1.1 Answer each of the questions given below by choosing the most appropriate option: (1X5=5)**

(i) The heart of India loved \_\_\_\_\_

- a) a highly developed military organization
- b) techniques of wars and imperialism
- c) loans
- d) pacifism

(ii) Principle of "Live and let live" means

- a) imperialism
- b) militarism

- c) frequency of wars among nations
- d) role of peace makers

(iii) Aryans preached and practiced this to the masses

- a) non-violence
- b) freedom of speech and action
- c) philosophical pacifisms
- d) practice of military organization

(iv) Mahabharata compares the warring world with

- a) wise men
- b) dog kennel
- c) song of the battle
- d) militarist

(v) Unearthing Mohan-jo-Daro reinforced the following of Pacifism

- a) there was no fortification and very few weapons
- b) they delivered the message of love
- c) they were apostles of peace
- d) thinks that the object of diplomacy is to avoid war

### **1.2 Answer the following questions briefly: (4m)**

- (i) How was war treated in India?
- (ii) Describe India's preparedness for war in spite of their belief in Pacifism.
- (iii) How did the Aryans practice the Doctrine of Pacifism?
- (iv) What is Ahimsa?

### **1.3 Pick out the words/phrases from the passage which are similar in meaning to the following: (3m)**

- (i) express in definite and clear terms (para 3 )
- (ii) defensive wall (para 3)
- (iii) the beginning (para 8)

### **Q2. Read the passage and answer the questions given below: (8)**

1. There is a clear dichotomy between Jayashankar Prasad's daily life and the one that found expression in his literature. In his literary formulations, Prasad advocated an escape- frompersonality ideal and categorically stated: "An artist's art", and not his person, is the touchstone to assess his work . . . it is only after losing his personality that he emerges in his art as an artist".

2. In Prasad's works – his poems, short stories, novels, dramas etc. – what emerges is life as shaped in the writer's inner self by his emotions, fancies, dreams, reveries . . . His writings are a record not of outer reality, but of the artist's inner world. As

such, of a proper appreciation and understanding of his works more emphasis needs to be placed on the working of his mind, than the events of his day-to-day life.

3. Prasad was born in a renowned family of Varansi. His grand-father Shiv Ratan Sahu, a dealer in high quality perfumed tobacco (snuff). Besides being an astute businessman, he was endowed with a marked cultural taste. His home was the meeting place of the local poets, singers, artists, scholars and men of religion. Prasad's father Devi Prasad Sahu carried forward this high tradition of family. Prasad, therefore, had a chance to study the various phases of human nature in the light of the business traditions, artistic taste and religious background of his family.

4. When the business had somewhat recovered, Prasad planned the publication of a literary journal. Prasad started the "Indu". The inaugural number appeared in July 1909. By this time Prasad's notions of literature had crystallized into a credo. In the first issue of Indu, he proclaimed, "Literature has no fixed aim; it is not slave to rules; it is free and all-embracing genius, gives birth to genuine literature which is subservient to none. Whatever in the world is true and beautiful is its subject matter. By the dealing with the True and Beautiful it establishes the one and affects the full flowering of the others. Its force can be measured by the degree of pleasure it gives to the reader's mind as also by criticism which is free of all prejudice". The words sound like the manifesto of romanticism in literature.

5. Even while recognizing the social relevance of literature, Prasad insisted, "The poet is a creator . . . he is not conditioned by his milieu; rather it is he who moulds it and gives it a new shape; he conjures up a new world of beauty where the reader for the time being, becomes oblivious of the outer world and passes his time in an eternal spring garden where golden lotuses blossom and the air is thick and pollen". Thus, the chief aim of literature according to Prasad is to give joy to the reader and to create a state of bliss in him. Later under the impact of Shaivadvaitism, this faith of Prasad got further strengthened.

**2.1** On the basis of your understanding of the above passage, make notes on it using headings and subheadings. Use recognizable abbreviations (wherever necessary - minimum four) and a format you consider suitable. Also supply an appropriate title to it. (4)

**2.2** Write a summary of the passage in about 100 words. (4)

## **SECTION-B WRITING SKILLS**

**30 marks**

**Q4.** You are Simar / Smriti of Lotus International School, Jodhpur. Your school is organizing a workshop on „Prevention of Drug Abuse“ in the coming week. Prepare a poster with complete information for the students of class X-XII. (4)

OR

You are Simar / Smriti of Lotus International School, Jodhpur. Your school has decided to contribute in controlling traffic near your school and requires the names of volunteers from IX to XII. Write a notice to be displayed on the notice board. (50 words) (4)

**Q5.** Pankaj/Pinky Das of 95, Bajrangi Road, Pune, sees an advertisement for the post of a PGT physics in a renowned school of Pune and decides to apply for the job. Write an application along with bio – data for the same in 120 – 150. (6marks)

OR

There has been an increase in the incidents of chain snatching and pick pocketing recently in your locality. Write a letter in 120 – 150 words to the superintendent of police requesting him to increase the police patrolling in your area so that such incidents are minimized. You are Ravish/Raunak of T – 25, civil lines, Jodhpur.

**Q6.** Recently you attended a seminar on “Benefits of Yoga”. Write an article in 150 – 200 words in your school magazine on the same topic highlighting the contribution of yoga in leading a peaceful and healthy life. You are Neera/Neeraj. (10marks)

OR

Television has become a part of your daily life. It reaches nearly every household, therefore it is a powerful tool for influencing the masses.

Write a speech in 150 – 200 words to be delivered in the morning assembly urging students to make their TV viewing more meaningful. You can inform them about special channels showing documentaries on our historical heroes, monuments as well as other channels that show live programmes of folk and classical music and dance. Use your own information and ideas and make your speech motivating.

**Q7.** Recently Annual Function was held in your school. Write a report to be published in your school’s Newsletter. Word limit: 150 – 200 words. (10marks)

OR

As Shreya/Shrey write an article on ‘Junk the Junk food’ to create an awareness among children that junk food is unhealthy and unhygienic. Word limit: 120 – 150 words.

### **SECTION – C (LITERATURE) (30marks)**

**Q8. Read the extract given below and answer the questions that follow: 4m**

**Perhaps the Earth can teach us  
as when everything seems dead  
and later proves to be alive  
now I will count up to twelve  
and you keep quiet and I will go.**

- a. What can Earth teach?
- b. What is the significance of keeping quiet?

- c. Name the poem and the poet.
- d. How can we achieve the state of 'seems dead'?

**Q9. Read the extract given below and answer the questions that follow: 4m**

"I now work in a tea stall down the road," he says, pointing in the distance, "I am paid 800 rupees and all my meals." Does he like the job? I ask. His face, I see, has lost the carefree look. The steel canister seems heavier than the plastic bag he would carry so lightly over his shoulder.

1. Why Sahib is not happy working in the tea stall?
2. Why has he lost his carefree look?
3. Why is steel canister heavier than plastic bag?
4. Name the author of the above lines.

**Q10. Answer any five of the following in 30 – 40 words each: (5x2=10)**

- a. What did garbage mean to the children of seemapuri and to their parents?
- b. Mention any four things of beauty that add joy to our life.
- c. In what condition did Dr. Sadao find the American soldier at the sea shore?
- d. How was the scene in the school different from that one other days?
- e. The crofter can be called a good host. Why?
- f. Why did Rogers Skunk go in the search of the wizard?
- g. what is the poets familiar ache and why does it return?

**Q11. Answer the following in 120 – 150 words: (6marks)**

Resolution needs complete sacrifice of one's time, wealth and physical stake. In view of this, highlight the role of Rajkumar Shukla as resolute in the lesson 'Indigo'.

**OR**

Throw light on the life of children working in the glass factories of Firozabad?

**Q12. Answer the following in 120 – 150 words: (6marks)**

Dr. Sadao was compelled by his duty as a doctor to help the enemy soldier. What made Hana, his wife, sympathetic to him in the face of open defiance from the domestic staff? (6marks)

**OR**

What moral questions does the story "Should Wizard Hit Mommy" raise?



# HALF YEARLY EXAMINATION SAMPLE PAPER

## XII

### CHEMISTRY

TIME: 3Hrs

M.M: 70

#### General Instruction:

- (i) Question numbers 1 to 20 are one mark questions.
- (ii) Question numbers 21 to 27 are two marks questions.
- (iii) Question numbers 28 to 34 are three marks questions.
- (iv) Question numbers 35 to 37 are five marks questions.

1. Gas (A) is more soluble in water than Gas (B) at the same temperature. Which one of the two gases will have the higher value of  $K_H$  (Henry's constant) and why?
2. Write the structure of 1-Bromo-4-chlorobut-2-ene.
3. Explain Etard reaction.
4. Write the IUPAC name of the following compound:  
 **$CH_2 = CHCH_2Br$**
5. In non-ideal solution, what type of deviation shows the formation of maximum boiling azeotropes.
6. What are isotonic solution?
7. What happens when bromine attacks  **$CH_2 = CH - CH_2 - C = CH$** ?
8. Draw the structure of 3-methyl butanol.
9. Which cell is used in automobiles and inverters?
10. How many ions are produced from the complex,  $[Co (NH_3)_6]Cl_2$  in solution?
11. What happens when  **$CH_3 - Br$**  is treated with KCN?
12. What happens when we place the blood cell in water (hypotonic solution)? Give reason.
13. Name the type of cell which was used in Apollo space program for providing electrical power.
14. Give an example of elastomers.
15. Explain "Reimer-Tiemann reaction" with one example.
16. Arrange the following compounds in increasing order of solubility in water:  
 **$C_6H_5NH_2$ ,  $(C_2H_5)_2NH$ ,  $C_2H_5NH_2$**
17. Write the name of the monomers used for getting Bakelite.
18. What does '6.6' indicate in the name nylon-'6.6'?
19. Name the method used for refining of copper metal.
20. Define thermoplastic polymers.
21. Which of the following pairs, will have greater conduction?

- (i) 0.1 Acetic acid solutions or 1M acetic acid solution.  
(ii) 0.1 M NaCl Solution at **25°C** and 0.1 M NaCl solution at **50°C**

22. A reaction of second order with respect to a reactant. How will the rate of reaction be affected if the concentration of this reactant is

- (i) Doubled,  
(ii) Reduced to half?

23. When a co-ordination compound **CrCl<sub>3</sub> · 6H<sub>2</sub>O** is mixed with **AgNO<sub>3</sub>**, 2 moles of AgCl are precipitated per mole of the compound. Write.

- (i) Structural formula of the complex.  
(ii) IUPAC name of the complex.

24. Non-ideal solutions exhibit either positive or negative deviations from Raoult's law. What are these deviations and why are they caused? Explain with one example for each type.

25. Illustrate the following reactions giving a chemical equation for each:

- (i) Kolbe's reaction,  
(ii) Williamson synthesis.

26. The chemistry of corrosion of iron is essentially an electrochemical phenomenon. Explain the reactions occurring during the corrosion of iron in the atmosphere?

27. Arrange the following compounds in increasing order of their property as indicated:

- (i) **CH<sub>3</sub>COCH<sub>3</sub>, C<sub>6</sub>H<sub>5</sub>COCH<sub>3</sub>, CH<sub>3</sub>CHO**  
(reactivity towards nucleophilic addition reaction)  
(ii) **Cl – CH<sub>2</sub> – COOH, F – CH<sub>2</sub> – COOH, CH<sub>3</sub> – COOH (acidic character)**

28. Write the structures and IUPAC names of the cross aldol condensation products only of ethanal and propanal.

29. Write the IUPAC names of the following coordination compounds:

- (i) **[Cr(NH<sub>3</sub>)<sub>3</sub>Cl<sub>3</sub>]**  
(ii) **K<sub>3</sub>[Fe(CN)<sub>6</sub>]**  
(iii) **[CoBr<sub>2</sub>(en)<sub>2</sub>]<sup>+</sup>, (en = ethylenediamine)**

30. Give reasons for the following:

- (i) Ethyl iodide undergoes **SN<sup>2</sup>** reaction faster than ethyl bromide.  
(ii) (±)2-Butanol is optically inactive.  
(iii) C-X bond length in halobenzene is smaller than C-X bond length in **CH<sub>3</sub> – X**.

31. How would you convert the following:

- (i) Phenol to benzoquinone  
(ii) Propanone to 2-methylpropan-2-ol  
(iii) Propene to propan-2-ol

32. Give simple chemical tests to distinguish between the following pairs of compounds:

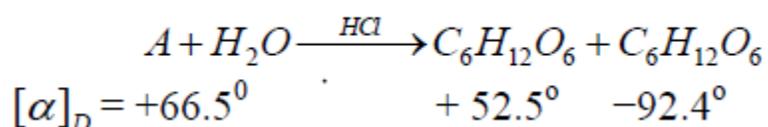
- (i) Ethanal and Propanol  
(ii) Benzoic acid and Phenol

(iii) Propanone to Propene

33. What is meant by crystal field splitting energy? On the basis of crystal field theory, write the electronic configuration of **d<sup>4</sup>** terms of **t<sub>2g</sub>** and **eg** in an octahedral field when:

- (i)  $\Delta_0 > P$   
(ii)  $\Delta_0 > P$

34. (i) A non reducing disaccharide 'A' on hydrolysis with dilute acid gives an equimolar mixture of D-(+)-glucose and D-(-)-Fructose.



Identify A. What is the mixture of D-(+)- glucose and D-(-)-Fructose known as? Name the linkage that holds the two units in the disaccharide.

(ii)  $\alpha$  -amino acids have relatively higher melting points than the corresponding halo acids. Explain

35. (i) Illustrate the following name reactions by giving example.

- (a) Cannizzaro's reaction  
(b) Clemmensen reduction

(ii) An organic compound A contains 69.77% carbon, 11.63% hydrogen and rest oxygen. The molecular mass of the compound is 86. It does not reduce Tollen's reagent but forms an addition compound with sodium hydrogen sulphite and gives positive iodoform test. On vigorous oxidation it gives ethanoic and propanoic acid. Derive the possible structure of compound A.

36. (i) A reaction is second order in A and first order in B.

- (a) Write the differential rate equation.  
(b) How is the rate affected on increasing the concentrations of both A three times?  
(c) How is the rate affected when the concentrations of both A and B are doubled?

(ii) A first order reaction takes 40 minutes for 30% decomposition. Calculate  $t_{1/2}$  for this reaction. (Given  $\log 1.428 = 0.1548$ )

37. Calculate the mass of a non-volatile solute (molar mass 40 g/mol) which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.

**Half Yearly Examination**  
**Class XII**  
**Subject - Mathematics**

**Time: 3 Hours**

**M.M:100**

**General instructions:**

- All questions are compulsory.
- Section A consists of 4 questions of 1 mark each.
- Section B consists of 8 questions of 2 marks each.
- Section C consists of 11 questions of 4 marks each.
- Section D consists of 6 questions of 6 marks each.
- Use of calculator is not allowed.

**Section A**

1. Find the value of a, b, c and d from the equation:

$$\begin{bmatrix} a - b & 2a + c \\ 2a - b & 3c + d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$$

2. Write the value of the determinant  $\Delta = \begin{vmatrix} x & a & x + a \\ y & b & y + b \\ z & c & z + c \end{vmatrix}$

3. If  $y = \sqrt{e^{\sqrt{x}}}$ , find  $\frac{dy}{dx}$ .

4. Evaluate :  $\int_2^3 3^x dx$ .

**Section B**

5. If  $y = \sin^{-1} \left( \frac{1-x^2}{1+x^2} \right)$ , find  $\frac{dy}{dx}$ .

6. The volume of a cube is increasing at a rate of 9 cubic centimeters per second. How fast is the surface area increasing when the length of an edge is 10 centimeters?

7. Evaluate:  $\int \frac{x^3}{\sqrt{1+x^2}} dx$ .

8. Evaluate:  $\int_0^{\frac{\pi}{2}} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx$ .

9. Find the equations of the tangent and normal to the curve  $x^{\frac{2}{3}} + y^{\frac{2}{3}} = 2$  at (1,1).

10. Find  $\frac{dy}{dx}$ , if  $y = 12(1 - \cos t)$ ,  $x = 10(t - \sin t)$ ,  $-\frac{\pi}{2} < t < \frac{\pi}{2}$ .

11. By using properties of determinants, prove that  $\begin{vmatrix} x+4 & 2x & 2x \\ 2x & x+4 & 2x \\ 2x & 2x & x+4 \end{vmatrix} = (5x+4)(4-x)^2$ .
12. Show that all the diagonal elements of a skew symmetric matrix are zero.

### Section C

13. Let  $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$ ,  $C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$ . Find a matrix D such that  $CD - AB = O$ .
14. The bookshop of a particular school has 10 dozen chemistry books, 8 dozen physics books, 10 dozen economics books. Their selling prices are Rs. 80, Rs. 60 and Rs. 40 each respectively. Find the total amount the bookshop will receive from selling all the books using matrix algebra.
15. If  $y = 3 \cos(\log x) + 4 \sin(\log x)$  then prove that  $x^2 y_2 + xy_1 + y = 0$ .
16. Differentiate w.r.t. x:  $(\log x)^x + (x)^{\log x}$ .
17. Find the approximate value of  $f(5.001)$ , where  $f(x) = x^3 - 7x^2 + 15$ .
18. Discuss the commutativity and associativity of binary operation '\*' defined on  $A = \mathbb{Q} - \{1\}$  by the rule  $a*b = a - b + ab$  for all  $a, b \in A$ . Also find the identity element of \* in A and hence find the invertible elements of A.
19. Evaluate :  $\int \frac{3x+5}{x^3-x^2-x+1} dx$ .
20. Evaluate :  $\int_0^1 \sin^{-1}\left(\frac{2x}{1+x^2}\right) dx$ .
21. Find  $\int_0^{\frac{\pi}{4}} \log(1 + \tan x) dx$ .
22. Find the relationship between a and b so that the function f defined by  $f(x) = \begin{cases} ax + 1 & \text{if } x \leq 3 \\ bx + 3 & \text{if } x > 3 \end{cases}$  is continuous at  $x = 3$ .
23. If  $x = a(\cos t + t \sin t)$  and  $y = a(\sin t - t \cos t)$ , find  $\frac{d^2y}{dx^2}$ .

### Section D

24. If  $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ , find prove that  $A^n = \begin{bmatrix} 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \end{bmatrix}$ ,  $n \in \mathbb{N}$ .
25. Use product  $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$  to solve the system of equations
- $$\begin{aligned} x - y + 2z &= 1 \\ 2y - 3z &= 1 \\ 3x - 2y + 4z &= 2 \end{aligned}$$
26. Consider  $f: \mathbb{R}_+ \rightarrow [-5, \infty)$  given by  $f(x) = 9x^2 + 6x - 5$ . Show that f is invertible with

$f^{-1}(y) = \left(\frac{\sqrt{y+6}-1}{3}\right)$ . Hence find

(i)  $f^{-1}(10)$ .

(ii)  $y$  if  $f^{-1}(y) = \frac{4}{3}$ , where  $\mathbb{R}_+$  is the set of all non negative real numbers.

27. A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a square and the other into a circle. What should be the length of the two pieces so that the combined area of the square and the circle is minimum?

28. Find  $\int \left[ \log(\log x) + \frac{1}{(\log x)^2} \right] dx$ .

29. Evaluate:  $\int [\sqrt{\cot x} + \sqrt{\tan x}] dx$ .

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