

BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN
ANNUAL EXAMINATION : (2025-2026)
ECONOMICS
CLASS: XI

Time: 3 Hours**Maximum Marks: 80****NAME: _____ SEC. : _____ ROLL NO. : _____****General Instructions:**

- This question paper contains two sections:
 Section A: Micro Economics
 Section B: Statistics for Economics
- Marks for questions are indicated against each question.
- Question No. 1-10 and 18-27 are 1 mark questions which are to be answered in one word/ sentence.
- Question No.11-12 and 28-29 are 3 marks questions which are to be answered in 60-80 words each.
- Question no. 13-15 and 30-32 are 4 marks questions which are to be answered in 80-100 words each.
- Question No. 16-17 and 33-34 are 6 marks questions which are to be answered in 100-150 words each.
 Question No. 17 is case-based question
- Answers should be brief and to the point and the above word limit be adhered to as far as possible.

SECTION A – MICRO ECONOMICS

- In which of the following situations, does scarcity arise? 1
 a) Supply of resources > Demand for resources
 b) Supply of resources < Demand for resources
 c) Supply of resources = Demand for resources
 d) Cannot be determined.
- Point of inflexion is referred to a point at which _____. 1
 a) curvature of TP curve changes
 b) AP is maximum
 c) AP=MP
 d) MP is zero.
- Statement 1: Raw material is an example of fixed input. 1
 Statement 2: Machine and building are variable inputs.
 a) Both the statements are true.
 b) Both the statements are false.
 c) Statement 1 is true and statement 2 is false.
 d) Statement 2 is true and statement 1 is false.
- What is the similarity between a normal PPC and a normal IC? 1
 a) Both are upward rising
 b) both are downward sloping
 c) Both are concave to the origin
 d) Both are convex to the origin
- Assertion (A): Law of Variable Proportion happens in production function. 1
 Reason (R) : MP increases at first then decreases.
 Choose the correct alternative from the following:
 a) Both A and R are true and R is the correct explanation of A.
 b) Both A and R are true but R is not the correct explanation of A.
 c) A is true but R is false.
 d) A is false but R is true.
- Statement 1: Movement happens due to change in own price. 1
 Statement 2: Innovation results in rightward shift of supply curve.
 a) Both the statements are true.
 b) Both the statements are false.
 c) Statement 1 is true and statement 2 is false.
 d) Statement 2 is true and statement 1 is false.

7. Assertion (A): Price level of a commodity can not be determined by a single firm. Reason (R) : Under monopoly the firm determines price. 1
- Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false.
 - A is false but R is true
8. If 4% increase in price of good X is accompanied with constant expenditure on the commodity, the elasticity of demand is equal to _____. 1
- one
 - zero
 - infinity
 - constant
9. Products under Perfect Competition are 1
- different
 - homogeneous
 - complementary
 - can not be told
10. Match the following : 1
- | Column I | Column II |
|-----------------------|--|
| A. Total Cost | i) Change in total cost when additional unit of output is produced |
| B. Marginal Cost | ii) Vertical summation of AFC and AVC curves |
| C. Fixed Cost | iii) Explicit cost + Implicit Cost |
| D. Average Cost Curve | iv) Does not change with increase or decrease in output. |
- A-i , B-ii , C-iii , D-iv
 - A-iii , B-i , C-iv, D-ii
 - A-ii, B-iii, C-i , D-iv
 - A-iv , B-iii , C-ii , D-i
11. Draw a PPC and write its properties. 3
- OR**
- A lot of people died and many factories are destroyed due to a severe earthquake in a country. How will it affect the country's PPC?
12. Quantity supplied of a commodity decreases by 25% when its price falls from Rs.5 to Rs.4 per unit. Calculate its price elasticity of supply. 3
13. State with valid reasons, which of the following are true or false 4
- AFC falls with the rise in output.
 - AVC curve must intersect MC curve at its minimum level.
 - TFC curve and TC curve have common starting point
 - MC curve depends necessarily on fixed cost.
- OR**
- Draw and explain AR and MR curve for both perfectly and imperfectly competitive market.
14. Find the missing values from the following schedule: 4
- | Labour(units) | TPP(units) | MPP(units) | APP(units) |
|---------------|------------|------------|------------|
| 0 | 0 | - | - |
| 1 | - | 20 | - |
| 2 | 42 | - | - |
| 3 | - | - | 20 |
| 4 | - | 16 | - |
| 5 | 90 | - | - |
| 6 | - | - | 16 |
| 7 | - | - | 12 |
15. Explain price ceiling with a diagram. 4
16. Establish Consumer's Equilibrium with the help of Indifference Curves. 6
- OR**
- $4x + 8y = 200$ is the equation of a given budget line. Write new equations and draw new budget lines if
- price of Y becomes half,
 - budget outlay becomes double.
17. Perfect Competition is Characterized by many buyers and sellers, identical products, and free entry and exit. No single firm can influence the market price; they are all "price takers." An example is a local vegetable market. Monopolistic Competition Involves many firms selling similar but differentiated products (e.g., through branding or quality). Barriers to entry are low, and firms have some control over their prices due to product differentiation. Examples include restaurants and hair salons. Oligopoly A market dominated by a few large firms. Products can be homogeneous or differentiated, and significant barriers to entry exist. Firms are interdependent, meaning one firm's decisions affect the

others. The airline and telecom industries are common examples. Monopoly Features a single seller in the market offering a unique product with no close substitutes. High barriers prevent other firms from entering. The single seller is a "price maker," controlling the market price. A national railway service can be a classic example.

Read the above paragraph carefully and give answer of the following questions.

- Under which category Indian Railway and Mobile Network companies may fall?
- Which type of firm can earn maximum profit and why?
- Why does perfect competition seem to be unrealistic in real world?

SECTION B – STATISTICS FOR ECONOMICS

- Which of the following methods is used when an investigator collects the required information with the respondent? 1
 - Mailing surveys
 - Indirect personal investigation
 - Direct personal investigation
 - Pilot surveys.
- In case of "Less than Ogive", the cumulative total tends to 1
 - Decrease
 - increase
 - remains constant
 - vary.
- Assertion (A): Sample method of investigation is economical. 1
Reason (R) : In sampling method, only limited number of items are investigated.
Choose the correct alternative from the following:
 - Both A and R are true and R is the correct explanation of A.
 - Both A and R are true but R is not the correct explanation of A.
 - A is true but R is false
 - A is false but R is true.
- Statement 1: Diagrammatic presentation provides simple and understandable information. 1
Statement 2: Diagrams have a long lasting impact.
 - Both the statements are true
 - Both the statements are false
 - Statement 1 is true and Statement 2 is false
 - Statement 2 is true and Statement 1 is false.
- Match the following : 1

Column I	Column II
A. Average	i) Mean of weighted items of the series
B. Arithmetic Mean	ii) Represents the whole group
C. Weighted Arithmetic Mean	iii) $(\bar{X}_1 N_1 + \bar{X}_2 N_2) / (N_1 + N_2)$
D. Combined Mean	iv) Simple average of all items in a series.
a) A-i , B-ii , C-iii , D-iv	b) A-ii , B-iii , C-iv ,D-i
c) A-ii, B-iv, C-i, D-iii	d) A-ii, B-iv, C-iii, D-i.
- Fisher's method of calculating index number is based on 1
 - arithmetic mean
 - geometric mean
 - harmonic mean
 - weighted mean.
- From the set of statements given in Column I and Column II, choose the correct pair of statements: 1

Column I	Column II
A. Scattered diagram	i) Measure the precise extent of correlation
B. Positive correlation	ii) Relationship between price and demand
C. Linear correlation	iii) The two sets of data do not show some fixed proportion to each other
D. Correlation	iv) Shows the direction and degree of relationship between the variables.
a) A-i	b) B-ii
	c) C-iii
	d) D-iv.
- Assertion (A): Arithmetic mean is the best method of central tendency 1
Reason (R) : Each element is included to count
 - Both A and R are true and R is the correct explanation of A
 - Both A and R are true but R is not the correct explanation of A
 - A is true but R is false
 - A is false but R is true.

26. When two variables change in the opposite direction, then such a correlation is called 1
 a) positive b) negative c) zero d) partial.

27. Statement 1: Lapeyre's method uses base year quantities as weight while constructing index numbers. 1
 Statement 2: Paasche's method uses current year quantities as weight while constructing index numbers.
 a) Both the statements are true
 b) Both the statements are false
 c) Statement 1 is true and Statement 2 is false
 d) Statement 2 is true and Statement1 is false.

28. Explain any three qualities of a good questionnaire. 3
OR

Explain any three precautions in the use of secondary data.

29. Explain the importance of central tendency. 3

30. Give examples with different types of tables expressing different types of classification. 4
OR

Represent the following data by a deviation bar diagram:

Year	2017	2018	2019	2020	2021	2022
Saving/Deficit in Rs.'000	40	-30	20	25	-35	30

31. Convert the following series in More Than and Less Than type of cumulative frequency series: 4

MARKS	FREQUENCY
5-10	3
10-15	8
15-20	9
20-25	4
25-30	4

32. Find the missing frequency when median is 24. 4

MARKS	0-10	10-20	20-30	30-40	40-50
NO. OF STUDENTS	5	25	?	18	7

33. Calculate coefficient of Correlation from the following data : 6

X	40	55	50	60	70	85	80	45
Y	80	120	160	170	140	200	210	130

OR

- a) Write the importance of correlation in real world situation.
 b) Write three properties of correlation coefficient.

34. Construct Index Number of the following data with Laspeyre's and Paasche's Method: 6

Commodity	Price in 2011	Quantity in 2011	Price in 2022	Quantity in 2022
A	24	8	30	10
B	9	3	10	4
C	16	5	20	8
D	10	3	9	4

BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN
ANNUAL EXAMINATION: (2025–2026)
ENGLISH CORE
CLASS: XI

Time: 3 Hours

Maximum Marks:80

NAME: _____ SEC.: _____ ROLL NO.: _____

General Instructions:

Read the following instructions very carefully and strictly follow them:

i. This question paper has 15 questions. All questions are compulsory.

ii. This question paper contains three sections:

Section A: Reading Skills

Section B: Grammar and Writing Skills

Section C: Literature

iii. Attempt all questions based on specific instructions for each part.

Write the correct question number and part thereof in your answer sheet.

iv. Separate instructions are given with each question/part, wherever necessary.

v. Adhere to the prescribed word limit while answering the questions.

SECTION A: READING SKILLS (26 marks)**1. Read the following text.****10
m**

- (1) How often do we remember to treat others as we would like them to treat us? In our quest to get more and more, we forget that the quality of our lives depends on the kind of personalities we have cultivated for ourselves. Genes might play a role when it comes to one's disposition, but the major portion of our attitudes and behavior is influenced by the choices we make. So at the beginning of every year if you resolve to make more money, learn a new language, or travel more frequently then you must discontinue being the same grumpy, impatient soul you always were, should you then not seek to refine your character, focus on nuances like how you treat people, react to challenges and deal with stressful situations? For most people, such a course would yield rich results.
- (2) According to Mary Thomas, usually, our New Year resolutions remain unachieved because we try to achieve the impossible or, sometimes, just add more goals that we wish to accomplish to the list of resolutions, but, strangely, we do not remember much about them during the course of the year as we do not seem to value them enough to complete them. The better option would be to address something fundamental to you, to who you really are, and go ahead with completing them instead of making any drastic resolutions that you will never be able to fulfill. You could resolve to be a better person by having a positive attitude towards people you come across in life. This could involve being nice to the lady who cleans the house, or your colleague who sits near you, but you never interacted with. Another trick is to acknowledge people for the value they add to your personal or professional life. By extending basic courtesies to people around you, you add value to your life and that pays off in the long run.
- (3) Sometimes, we know that there is room for improvement as far as our personalities are concerned but we have little or no idea where to make the start. An easy starting point could be to look for opportunities in one's immediate surroundings. One positive starting point could be taking a positive attitude towards life and dispelling all negative thoughts. You could make a positive beginning by being a better person at work. This means treating everyone with respect. You should not only interact politely but also value each person's ideas however far removed they may be, from your own. After all, your friend's ideas are an integral part of the organization to which both of you belong. Inculcating this habit of making an effort to talk to people

you would normally not have to interact with, on a daily basis, would make you a better person at the workplace.

- (4) Also, you do not have to do something extraordinary to prove your good intentions. Just greeting or smiling at your colleagues' first thing in the morning could always brighten someone's day. These are simple things that we are taught while growing but tend to forget as we move through life. So essentially, being better is an exercise in learning to be nice, and you will see that playing nice will get your work done better than scolding or frowning, or passing orders.
- (5) A purposeful life should contain skills that lead to practical changes. After all, no people are alike, so why should your ideas be the only right solution? A company, where individual differences are nurtured, and information is not suppressed, soon becomes a workplace that adds value to its employees, rather than merely extracting work out of them. It makes workers feel intrinsically rewarded. It is, therefore, imperative that co-workers and partners share a camaraderie that transcends mere professional conduct and delivery. Thus, for a person who wishes to remain happy and content, it is as valuable to spend time on nurturing qualities like friendship and consideration as it is on acquiring skills and knowledge.

Answer the following questions, based on the given passage.

- I. The quality of our lives depends on _____. 1
 - A. the personalities we have cultivated for ourselves
 - B. the number of New Year resolutions we make
 - C. the challenges that people give us
 - D. Both (B) and (C)
 - II. What is an easy starting point for self-improvement? 1
 - III. Our New Year resolutions remain unfulfilled, according to Mary Thomas, because we _____. 1
 - A. make too many resolutions
 - B. add more goals than what we can accomplish
 - C. get caught up with our studies
 - D. feel happy about them
 - IV. Which word from the passage means "friendship and mutual trust"? 1
 - V. To add value to your life you _____. 1
 - A. must earn more money
 - B. become more hardworking
 - C. should be nice to the people in your immediate surroundings
 - D. Only (B) and (C)
 - VI. How does acknowledging individual differences at the workplace help employees? 2
 - VII. Workers feel intrinsically rewarded if _____. 1
 - A. they are given bonuses
 - B. their work is given recognition
 - C. their individual differences are acknowledged
 - D. none of the above
 - VIII. Why is refining one's character more important than making material resolutions? 2
- 2. Read the following text.** **8 m**
- (1) In recent years, there has been a surge in both group and solo travel among young adults in India. A survey conducted among young adults aged 18-25 aimed to explore the reasons behind their travel preferences and recorded the percentage variation for 10 common points that influence travel choices.
 - (2) Among those who prefer solo travel, the most common reason cited was the desire for independence and freedom (58%), followed closely by the opportunity for introspection and self-discovery (52%). Additionally, solo travellers appreciated the ability to customize their itinerary to their preferences (44%) and the chance to meet new people on their own terms (36%).

- (3) On the other hand, those who prefer group travel often cited the desire for socializing and making new friends (61%) as their primary reason. Group travel also provided a sense of security and safety in unfamiliar places (52%) and allowed for shared experiences and memories with others (48%). Additionally, group travellers enjoyed the convenience of having preplanned itineraries and organized transportation (38%).
- (4) Interestingly, both groups had similar levels of interest in exploring new cultures and trying new experiences (40% for solo travellers, 36% for group travellers). Similarly, both groups valued the opportunity to relax and escape from the stresses of everyday life (36% for solo travellers, 32% for group travellers).
- (5) However, there were also some notable differences between the two groups. For example, solo travellers placed a higher priority on budget-friendly travel options (38%) compared to group travellers (24%). Conversely, group travellers were more likely to prioritize luxury and comfort during their travels (28%) compared to solo travellers (12%).
- (6) Overall, the survey results suggest that both group and solo travel have their own unique advantages and appeal to different individuals, based on their preferences and priorities.

Answer the following questions, based on the given passage.

- I. Infer two possible ways that the survey, mentioned in paragraph (1) could be beneficial. Answer in about 40 words. 2
- II. Which travel choice point of the survey would influence tour operators to incorporate group dinners, social events, and shared accommodations in their itinerary? 1
 - A. Freedom to customise itinerary
 - B. Luxury and comfort
 - C. Security and safety
 - D. Desire for making new friends
- III. What do the top choices in the survey, for traveling solo and in a group suggest about young adults? 1
- IV. Identify the solo traveller from the following three travellers: 1
 - A. Reshma- I don't want to keep hunting for rickshaws or taxis. A prebooked vehicle is perfect.
 - B. Nawaz-I'm happy sharing a room in a hostel. I don't need hotel accommodation.
 - C. Deepak-I'm not worried about my well-being , even while exploring remote areas.
- V. Which of the following is an example of an opportunity for self-discovery, as mentioned in paragraph 2? 1
 - A. Trying new cuisine
 - B. Hiring a tour guide
 - C. Purchasing local artifacts
 - D. Advance booking travel tickets
- VI. How might the differences in budget priorities between solo and group travellers impact the types of accommodations and activities offered by the travel industry in India? 2

3. Read the following text.

8 m

- (1) In today's fast-paced digital age, social media has become an integral part of daily life, especially among teenagers and young adults. Platforms such as Instagram, Snapchat, and WhatsApp allow instant communication, self-expression, and access to global information. While social media offers several advantages, its excessive use has also raised serious concerns.
- (2) One major benefit of social media is connectivity. It helps people stay in touch with friends and family, irrespective of distance. It also provides educational resources, awareness campaigns, and opportunities for creativity and entrepreneurship. Many young people use these platforms to showcase their talents and build careers.
- (3) However, excessive social media usage can negatively impact mental health. Studies suggest that prolonged screen time may lead to anxiety, low self-esteem, and reduced concentration. The pressure to maintain an online image often causes stress and emotional imbalance. Additionally, overdependence on social media can reduce real-life social interaction and productivity.

- (4) Another significant concern related to social media is the spread of misinformation. False news and misleading content can circulate rapidly, influencing opinions and behavior, especially among young users who may not always verify information before sharing it.
- (5) Social media can also affect physical health. Long hours spent on screens often lead to poor posture, eye strain, and lack of physical activity. This sedentary lifestyle may contribute to health issues such as obesity and fatigue among young users.
- (6) To address these challenges, awareness and digital literacy are essential. Educating users about responsible online behavior, privacy protection, and critical evaluation of content can help minimize risks. Schools and families play a crucial role in guiding young people towards balanced and mindful use of social media.
- A. 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. 5
- B. Write a summary of the passage in about 80 words. 3

SECTION B: GRAMMAR & WRITING SKILLS (23 marks)

4. Do as Directed:

**1x7
=7**

- I. Identify the part of the sentence that has an error in it.
Neither the students (P)/ nor the teacher (Q)/ have finished (R)/ the work yet (S).
A. P B. Q C. R D. S
- II. You can take a taxi. You can walk to the station. (Convert to a Compound Sentence)
- III. Since he was late, he missed the bus. (Convert to a Simple Sentence)
- IV. Rearrange the alphabets (P,Q,R,S) given below in correct order to make a meaningful sentence.
P- through the dense forest
Q- although it was raining
R- without any delay
S- we continued our journey
- V. The students have been praised by the teacher for their performance. (Change the voice)
- VI. We should submit the assignment today. (Add question tag)
- VII. She asked me if I had finished my homework. (Convert to Direct Sentence)

5. Attempt ANY ONE of two, in about 50 words.

3

- A. You are Amina/Aman, the Sports Captain of your school. Make a poster highlighting the 'Importance of Sports in Life'.

OR

- B. You are Avni/Avinash. As a member of the Cyber Safety Club, design a poster on 'Safe Use of Social Media'.

6. Attempt ANY ONE of two, in about 50 words.

3

- A. You are Rahul Mehta, a resident of 7, Green Park, New Delhi. Prepare a classified advertisement seeking a post of an Office Assistant.

OR

- B. You are Aman Singh, residing at 30, Rajendra Nagar, Bhopal. Prepare a classified advertisement to sell your used laptop.

7. Attempt ANY ONE of two, in about 120-150 words.

5

- A. You are Rahul Mehta, the President of the Road Safety Club of your school. Prepare a speech on 'Road Safety and Responsible Driving' highlighting the values of respect for human life, discipline, social responsibility, and patience. You can use the following value points:

- ❖ Respect for human life
- ❖ Discipline and obedience to traffic rules
- ❖ Responsibility towards society and fellow road users

- ❖ Patience and self-control while driving

OR

- B. You are Pooja Nair, a student speaker at a health awareness programme. Write a speech on 'Healthy Lifestyle for Students' highlighting the values of self-discipline, responsibility towards health, balanced living, and health awareness. You can use the following value points:

- Self-discipline and healthy habits
- Responsibility towards one's own health
- Balance between studies, physical activity, and rest
- Awareness and prevention of lifestyle diseases

8. Attempt **ANY ONE** of two, in about 120-150 words. **5**

- A. You are Riya Sen, a member of the Eco Club. Prepare a debate for or against the motion 'Plastic Should Be Completely Banned', highlighting the values of environmental responsibility, concern for health and wildlife, sustainable living, and responsibility towards future generations.

OR

- B. You are Meera Joshi, representing your school in a debate competition. Prepare a debate for or against the motion 'Books Are Better Than Digital Media', highlighting values such as deep learning and healthy reading habits, as well as accessibility and convenience of digital media.

SECTION C: LITERATURE TEXTBOOK AND SUPPLEMENTARY READING TEXT (31 marks)

9. Read the given extracts and answer the questions for **ANY ONE** of the two, given. **3**

- A. The Laburnum top is silent, quite still

In the afternoon yellow September sunlight,
A few leaves yellowing, all its seeds fallen. (The Laburnum Top)

I. Assertion (A): The setting of the poem reflects the season of decline. **1**

Reason (R): The mention of "September" and "yellowing leaves" suggests autumn.
Choose the correct option:

- A. Both A and R are true, and R is the correct explanation for A.
- B. Both A and R are true, but R is not the correct explanation for A.
- C. A is true, but R is false.
- D. A is false, but R is true.

II. Identify the line which uses the same poetic device as in: **1**

"The Laburnum top is silent, quite still"

- A. The wind whispered through the night.
- B. As brave as a lion.
- C. The world is a stage.
- D. For men may come and men may go.

III. Complete the Sentence: **1**

The phrase "yellow September sunlight" helps to create a mood of _____ and _____.

- | | |
|----------------------------|------------------------|
| A. joy and celebration | B. decay and stillness |
| C. excitement and movement | D. fear and darkness |

OR

- B. When did my childhood go?
Was it the day I ceased to be eleven,
Was it the time I realised that Hell and Heaven,
Could not be found in Geography,...
(Childhood)

I. Assertion (A): The poet associates the loss of childhood with the growth of rational thinking. **1**

Reason (R): He realises that concepts like Heaven and Hell are not physical places.
Choose the correct option:

- A. Both A and R are true, and R is the correct explanation for A.

- B. Both A and R are true, but R is not the correct explanation for A.
 C. A is true, but R is false.
 D. A is false, but R is true.
- II. Which of the following statements are correct? 1
1. The poet reflects on losing innocence.
 2. The poet believes Heaven and Hell exist on maps.
 3. The extract highlights a transition from belief to logic.
 4. Childhood is linked with unquestioned faith.
- Choose the correct option:
 A. 1, 3 and 4 B. 2 and 4 C. 1 and 2 D. Only 3
- III. Complete the Sentence. 1
- The realisation that Heaven and Hell cannot be found in Geography suggests the poet's move towards _____ and _____ thinking.
- A. imaginative and creative B. logical and rational
 - C. emotional and sensitive D. spiritual and religious
- 10.** Read the given extracts and answer the questions for **ANY ONE** of the two, given. **3**
- A. "The mummy is in very poor condition because of what Carter did in the 1920s," said Zahi Hawass, Secretary General of Egypt's Supreme Council of Antiquities. "Carter cut the mummy apart to remove the gold."
 (Discovering Tut: The Saga Continues)
- I. Which of the following statements are correct? 1
1. The mummy was found intact and unharmed.
 2. Carter separated parts of the mummy.
 3. Gold ornaments were attached to the body.
 4. Modern experts condemn Carter's actions.
- Choose the correct option:
 A. 1 and 2 B. 2, 3 and 4 C. 1, 3 and 4 D. Only 4
- II. Assertion (A): The condition of Tut's mummy reflects unethical archaeological practices of the past. 1
- Reason (R): Early archaeologists prioritised preservation over material wealth.
- Choose the correct option:
 A. Both A and R are true, and R is the correct explanation for A.
 B. Both A and R are true, but R is not the correct explanation for A.
 C. A is true, but R is false.
 D. A is false, but R is true.
- III. The word "cut" in the extract suggests that Carter's actions were: 1
- A. careful and scientific B. violent and destructive
 - C. accidental D. necessary for research

OR

- B. From the gently rolling hills of Ravu, the short cut took us across vast open plains with nothing in them except a few gazelles that would look up from nibbling the arid pastures and frown before bounding away into the void. Further on, where the plains became more stony than grassy, a great herd of wild ass came into view. Tsetan told us we were approaching them long before they appeared. "Kyang," he said, pointing towards a far-off pall of dust. When we drew near, I could see the herd galloping en masse, wheeling and turning in tight formation as if they were practising manoeuvres on some predetermined course. Plumes of dust billowed into the crisp, clean air.
 (Silk Road)
- I. Assertion (A): The landscape described is rich in natural beauty and wildlife. 1
- Reason (R): The presence of grasslands, animals, and dusty plains creates a vivid picture.
- Choose the correct option:
 A. Both A and R are true, and R is the correct explanation for A.

- B. Both A and R are true, but R is not the correct explanation for A.
 C. A is true, but R is false.
 D. A is false, but R is true.
- II. Complete the Sentence: 1
 The mention of gazelles and wild asses mainly highlights the _____ of the region.
 A. harsh climate B. natural wildlife
 C. religious significance D. trade activity
- III. The word "vast" in the extract suggests: 1
 A. crowded B. endless and wide
 C. dangerous D. polluted
- 11.** Read the given extracts and answer the questions for **ANY ONE** of the two, given. **4**
- A. "We were poor. We had no money. But my cousin Mourad enjoyed being alive more than anyone I had ever known. He was crazy, but not that crazy. He was crazy about horses."
 (The Summer of The Beautiful White Horse)
- I. Which of the following statements are correct? 1
 1. The narrator's family lived in poverty.
 2. Mourad was irresponsible and dishonest by nature.
 3. Mourad had a deep passion for horses.
 4. Mourad was a crazy person.
 Choose the correct option:
 A. 1 and 2 B. 2 and 3 C. 1, 3 and 4 D. 1 and 4
- II. Assertion (A): Mourad's love for horses highlights his free-spirited and unconventional nature. 1
 Reason (R): Mourad believed that personal happiness was more important than moral values.
 Select the correct answer:
 A. Both A and R are true, and R is the correct explanation for A.
 B. Both A and R are true, but R is not the correct explanation for A.
 C. A is true, but R is false.
 D. A is false, but R is true.
- III. The word "crazy" in the extract suggests that Mourad was: 1
 A. mentally unstable
 B. dangerous and reckless
 C. passionately enthusiastic
 D. dishonest and careless
- IV. The narrator's tone in the extract is _____. 1
 A. Sarcastic and critical
 B. Admiring and affectionate
 C. Neutral and factual
 D. Angry and frustrated

OR

- B. In the city of which I sing
 There was a just and placid King.
 The King proclaimed an arch should be
 Constructed, that triumphally
 Would span the major thoroughfare
 To edify spectators there. (The Tale of Melon City)
- I. Which of the following statements are correct? 1
 1. The King wanted to gain public approval.
 2. The arch was constructed thoughtfully and carefully.
 3. The King ruled with arbitrary authority.
 4. The King build the arch at the corner of the road.

Choose the correct option:

- A. 1 and 2 B. 2 and 4 C. 1 and 3 D. 3 and 4

- II. Assertion (A): The extract highlights the King's desire to impress and showcase authority. 1

Reason (R): The King wanted the arch to serve as an edifying spectacle for the spectators.

Select the correct answer:

- A. Both A and R are true, and R is the correct explanation for A.
B. Both A and R are true, but R is not the correct explanation for A.
C. A is true, but R is false.
D. A is false, but R is true.

- III. The word "proclaimed" in the extract suggests that the King: 1

- A. announced something publicly and authoritatively
B. hesitated before making a decision
C. quietly suggested the arch to be built
D. was unsure about his orders

- IV. The poem is primarily a satire on: 1

- A. farmers and agriculture
B. foolishness in leadership and society
C. historical events in Melon City
D. the justice system only

12. Answer **ANY ONE** question from question no. I. and II and **ANY ONE** from question no. III and IV, in about 40-50 words. **3x2 =6**

- I. How did the narrator react to the problems that occurred on their voyage? What does it reveal about him? (We're Not Afraid to Die if We Can All Be Together)

OR

- II. How did the victory of the Marathas in the Battle of Panipat affect the balance of power? (The Adventure)

- III. Why do you think the father appears to be helpless in the poem 'Father to Son'?

OR

- IV. On what does the rain descend? What does it do to those things on which it falls? (The Voice of the Rain)

13. Answer **ANY ONE** of the following two questions, in about 40-50 words. **3x1 =3**

- I. What last warning did Mrs. Fitzgerald give to Mrs. Pearson? (Mother's Day)

- II. "The Tale of Melon City" is full of irony. Give any two examples from the poem.

14. Answer **ANY ONE** of the following two questions, in about 120-150 words **6**

- A. The 'Portrait' generally means a painting, a drawing or a photograph but here it implies a representation or impression of someone in language. Draw a pen picture of Khuswant Singh's grandmother as you have felt after reading the chapter. (The Portrait of a Lady)

OR

- B. You are Shirley Toulson. The poem "A Photograph" prompts reflection on how time changes people and relationships. Write a diary entry expressing your thoughts on time, the fleeting nature of life, and your bond with your mother.

15. Answer **ANY ONE** of the following two questions, in about 120-150 words. **6**

- A. How does the narrator's encounter with Mrs. Dorling reflect her emotional growth and changing perception of people? Explain with examples from the story. (The Address)

OR

- B. What impression do you form of Andrew Manson on the basis of the story, 'Birth'.

BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN

ANNUAL EXAMINATION: (2025-2026)

BIOLOGY

CLASS: XI

Time: 3 Hours

Maximum Marks: 70

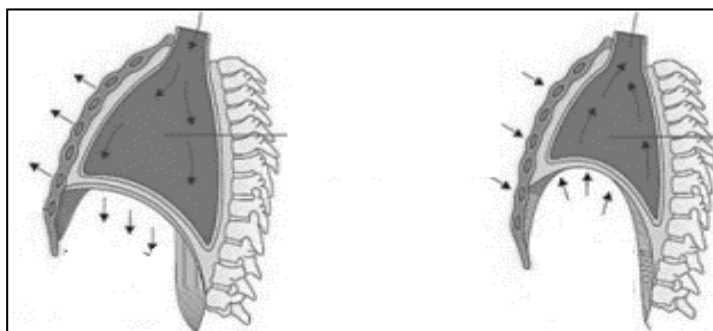
NAME: _____ SEC.: _____ ROLL NO.: _____

General Instructions:

- (i) This question paper contains 33 questions. All questions are compulsory.
- (ii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
- (iii) There is no overall choice. Answer all 33 questions. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (iv) Wherever necessary, neat and properly labelled diagrams should be drawn.

Section - A

1. A pregnant female delivers a baby who suffers from stunted growth, mental retardation, low intelligence quotient and abnormal skin. This may be because of 1
 - (a) low secretion of growth hormone
 - (b) cancer of thyroid gland
 - (c) over secretion of pars distalis
 - (d) deficiency of iodine in diet.
2. In resting state, sodium-potassium pump transports 1
 - (a) three sodium ions outside for two potassium ions into the cell
 - (b) two sodium ions outside for three potassium ions into the cell
 - (c) three sodium ions outside for three potassium ions into the cell
 - (d) two sodium ions outside for two potassium ions into the cell.
3. Which of the following combinations of hormones binds with intracellular receptors? 1
 - (a) Insulin, FSH, Cortisol
 - (b) Glucagon, Testosterone, FSH
 - (c) Thyroxine, Testosterone, Estradiol
 - (d) Insulin, Androgen, PTH
4. Which of the following cells of an adult will **NOT** exhibit mitosis? 1
 - (a) Blood Megakaryocytes
 - (b) Cells lining the gut
 - (c) Heart cells
 - (d) Cells of upper layer of epidermis
5. The following statements are drawn as conclusions for the image shown. 1



- I. The movement of air into and out of the lungs is carried out by creating a pressure gradient.
- II. Expiration can occur if the pressure within the lungs (intra-pulmonary pressure) is less than the atmospheric pressure.
- III. The diaphragm and a specialised set of muscles help in generation of pressure gradients.
- IV. Expiration is initiated by the contraction of diaphragm which increases the volume of thoracic chamber in the antero-posterior axis.

Choose from below the correct alternative.

- (a) Only I is true (b) I and IV are true (c) III and II are true (d) I and III are true

6. To increase sugar production in sugarcane, they are sprayed with 1
 (a) IAA (b) Cytokinin (c) Gibberellin (d) Ethylene
7. When we homogenise any tissue in an acid the acid soluble pool represents 1
 (a) Cytoplasm (b) Cell membrane (c) Nucleus (d) Mitochondria
8. Which of the following exhibits the highest rate of respiration? 1
 (a) Growing shoot apex (b) Germinating seed (c) Root tip (d) Leaf bud
9. In some animal groups, the body is found divided into compartments with serial 1
 repetition of at least some organs. This characteristic feature is called
 (a) segmentation (b) metamerism (c) metagenesis (d) metamorphosis.
10. Naked cytoplasm, multinucleated and saprophytic are the characteristics of 1
 (a) Monera (b) Protista (c) Fungi (d) Slime molds
11. Endosperm, a product of double fertilization in angiosperms is absent in the seeds of 1
 (a) Coconut (b) Orchids (c) Maize (d) Castor
12. During anaphase-I of meiosis 1
 (a) homologous chromosomes separate
 (b) non-homologous chromosomes separate
 (c) sister chromatids separate
 (d) non-sister chromatids separate.

Question number 13 to 16 consists of two statements – **Assertion (A)** and **Reason (R)**.

Answer the question selecting the appropriate option given below:

- a) Both A and R are true, and R is the correct explanation of A.
 b) Both A and R are true, and R is not the correct explanation of A.
 c) A is true but R is false.
 d) A is false but R is true.
13. **Assertion(A):** The imbalance in concentration of Na^+ , K^+ and proteins generates resting 1
 potential.
Reason(R): To maintain the unequal distribution of Na^+ & K^+ , the neurons use electrical 1
 energy.
14. **Assertion(A):** Alveoli are the primary sites for exchange of gases. 1
Reason(R): All factors in our body are favourable for diffusion of O_2 from alveoli to 1
 tissues and that of CO_2 from tissues to alveoli.
15. **Assertion(A):** As per Schwann, cell wall is a unique character of the plant cell. 1
Reason(R): Body of plants and animals are composed of cells and products of cells.
16. **Assertion(A):** Gram-negative bacteria do not retain the stain when washed with alcohol. 1
Reason(R): The outer face of the outer membrane of gram-negative bacteria contains 1
 lipopolysaccharides, a part of which is integrated into the membrane lipids.

Section - B

17. Observe the following figures and give answer of the understated question. 2

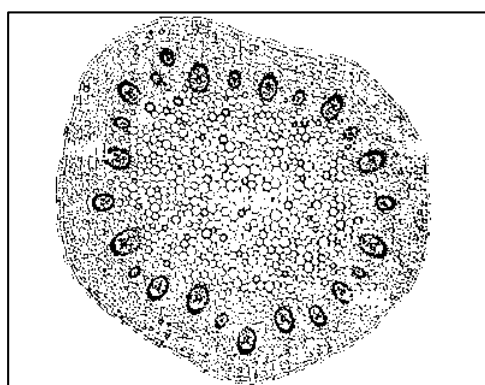


Fig.:- (A)

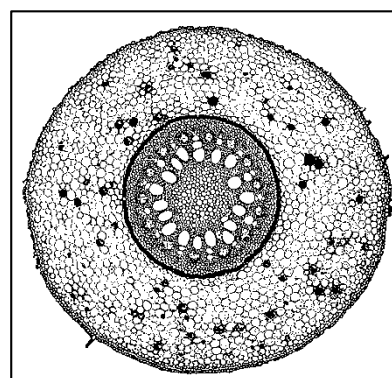


Fig.:- (B)

How will you identify which slide is of root and which is of stem?

18. (i) How hormone regulates erythropoiesis? 2
 (ii) 'Gastrointestinal tract serves as endocrine organ' – Determine credibility of this statement.
19. A gap junction facilitates intercellular communication. Predict outcome of this 2
 observation.

20. $2\text{H}_2\text{O} \rightarrow 2\text{H}^+ + 4\text{e}^- + \text{O}_2\uparrow$. Based on the above equation, answer the following questions. 2
- (i) Where does this reaction take place in plants?
- (ii) What is the significance of this reaction?

21. **Attempt either A or B** 2

A) Aquatic animals generally are ammonotelic in nature whereas terrestrial forms are not. Comment. Mention one diseased condition when Ketonuria is observed.

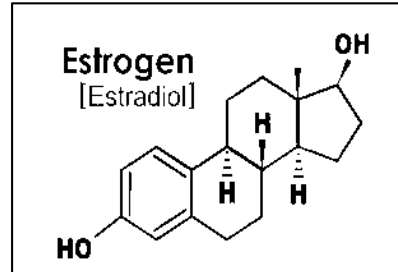
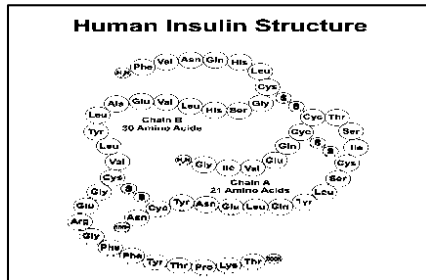
OR

B) Mention any two metabolic disorders, which can be diagnosed by analysis of urine. Identify the glands that perform the excretory function in prawns.

Section - C

22. What is the significance of the time gap in the passage of action potential from the sinoatrial node to the ventricle? What is meant by coronary artery disease? 3

23. 3



Insulin is a protein hormone which has two subunits alpha and beta, joined together by disulphide linkages. But this hormone serves the function in a cell differently than other protein hormone. Whereas Progesterone hormone is a derivative of cholesterol. How these two hormones act in a cell at molecular level?

24. While we practice yoga, we control our breathing consciously. But during sleep and most of the time in a day, respiration do not require our conscious involvement. Critically judge physiology of control of respiration. 3

25. Give reasons: 3

- (i) *Scoliodon* needs to swim constantly.
- (ii) Birds have pneumatic bones.
- (iii) Platypus, though oviparous, is a mammal.

26. 3



Areeba, an apple farmer is setting up a new orchard. At different stages she will use different growth promoters and/or growth inhibitors. Which plant hormones she will use and how it will work on that basis, design a plan for plant hormone distribution.

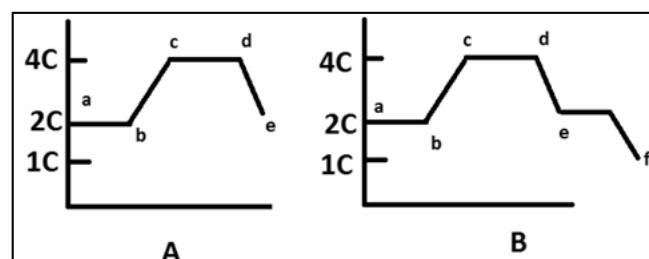
27. **Attempt either A or B** 3

A) Difference between Haemoglobin in corpuscles and Haemoglobin in Plasma.

OR

B) Why the renal portal system is absent in mammals?

28. Study the graphs shown below for DNA content in a normally dividing cell till the division is completed. 3



Answer the following questions.

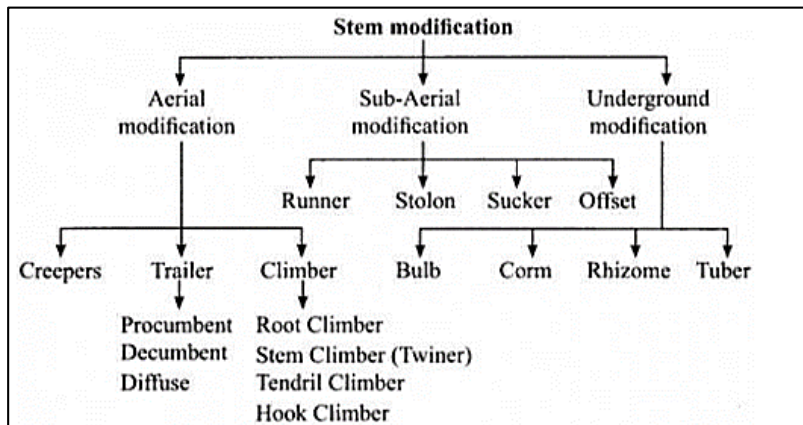
- (i) Identify the type of cell division depicted in A and B.
- (ii) Which line segment represents the S phase. Justify.

Section - D

29. **Read the following text carefully and answer the questions that follow:**

4

Various parts of the plant such as stems, leaves, and even fruits are modified into underground parts to perform various functions such as storage of food. The stems in ginger and banana are underground and swollen due to storage of food. They are called rhizome. Rhizome of ginger is a modification of stem because it bears nodes, internodes, terminal buds, scaly leaves and buds, which give rise to aerial shoots. It is not a root because root does not have nodes and internodes. Also, rhizome does not perform the function of roots i.e. anchorage and absorption, rather it serves as reservoir for storage of food. Similarly, corm is an underground stem in Colocasia (jirikand). The tips of the underground stem in potato become swollen due to accumulation of food and forms tuber.



(a) Observe the given flow chart and mention what are the four types of underground stem modification also mention one example of each.

(b) Ginger is an underground stem but why it is distinguished from a root?

Attempt either c or d

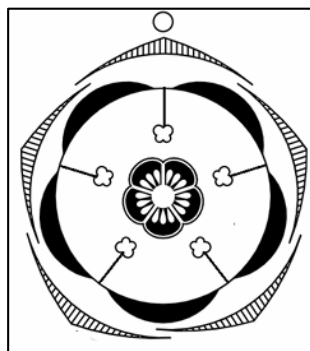
(c) Why do the tips of modified stems in potatoes become swollen?

OR

(d) Are all underground parts of a plant roots?

30. Given below is a floral diagram.

4



(a) Identify the aestivation shown in the calyx and corolla of the above flower.

(b) Name the type of placentation seen in its ovary. Give example of a flower showing such placentation.

Attempt either c or d

(c) Write the floral formula of the given flower.

OR

(d) Enlist four characteristics of its androecium.

Section - E

31. **Attempt either A or B**

5

A. (i) Respiratory pathway is believed to be a catabolic pathway. However, nature of TCA cycle is amphibolic. Explain.

(ii) Compare fermentation and aerobic respiration in the context of respiratory balance sheet, enzymes involved, organisms exploit it & applications in industry.

OR

- B. (i) RuBP carboxylase, PEP carboxylase, Pyruvate dehydrogenase, ATPase, Cytochrome oxidase, Lactate dehydrogenase ----- State the role of above enzymes in a biological system.
(ii) Write any two energy yielding reactions of glycolysis.
32. **Attempt either A or B** 5
- A. (i) Calcium plays a very important role in the formation of bones. Write on the role of endocrine glands and hormones responsible for maintaining Calcium homeostasis.
(ii) What is the role-played by luteinizing hormones in males and females respectively?
- OR**
- B. (i) A sample of urine was diagnosed to contain high content of glucose and ketone bodies. Based on this observation, answer the following:
a. Which endocrine gland and hormone is related to this condition?
b. Name the cells on which this hormone acts.
c. What is the condition called and how can it be rectified?
(ii) How I^- play a major role in production of thyroxine hormones (T_3 & T_4)?
33. **Attempt either A or B** 5
- A. (i) Our reaction like aggressive behaviour, use of abusive words, restlessness etc. are regulated by brain, name the parts involved.
(ii) Mention two differences between electrical transmission and chemical transmission in context of nervous system.
(iii) Write a short note on mid brain.
- OR**
- B. (i) Mention two differences between thalamus and hypothalamus.
(ii) Explain the following process
(a) Polarisation of the nerve fibre membrane.
(b) Depolarisation of the nerve fibre membrane.
(c) Transmission of nerve impulse through myelin sheath and nodes of Ranvier.

Time: 3 Hours

Maximum Marks: 70

NAME: _____ SEC.: _____ ROLL NO.: _____

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. There are **33** questions in this question paper with internal choice.
2. **SECTION A** consists of 16 multiple-choice questions carrying **1** mark each.
3. **SECTION B** consists of 5 very short answer questions carrying **2** marks each.
4. **SECTION C** consists of 7 short answer questions carrying **3** marks each.
5. **SECTION D** consists of 2 case-based question carrying **4** marks each.
6. **SECTION E** consists of 3 long answer questions carrying **5** marks each.
7. **All questions are compulsory.**
8. **Use of log tables and calculators is not allowed.**

Section A

The following questions are multiple -choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

1. Which of the following contains the maximum number of molecules? 1
 a) 1g CO₂ b) 1g N₂ c) 1g H₂ d) 1g CH₄
2. The number of radial nodes for a 3p orbital is: 1
 a) 3 b) 1 c) 2 d) 0
3. Which series of lines in the hydrogen spectrum appears in the visible region? 1
 a) Lyman b) Balmer c) Paschen d) Brackett
4. Which of the following has the highest negative electron gain enthalpy? 1
 a) Fluorine b) Chlorine c) Oxygen d) Nitrogen
5. The general electronic configuration of d-block elements is: 1
 a) ns² np⁶ b) (n-1)d¹⁻¹⁰ns¹⁻² c) (n-1)d¹⁰ns² d) ns²
6. The shape of SF₄ molecule is: 1
 a) tetrahedral b) see-saw
 c) square planar d) trigonal bipyramidal
7. Which of the following species is paramagnetic? 1
 a) N₂ b) O₂ c) C₂ d) H₂
8. The correct thermodynamics conditions for the spontaneous reaction at all temperature is 1
 a) $\Delta H < 0$ and $\Delta S > 0$ b) $\Delta H < 0$ and $\Delta S < 0$
 c) $\Delta H < 0$ and $\Delta S = 0$ d) $\Delta H > 0$ and $\Delta S < 0$
9. The oxidation number of Cr in K₂Cr₂O₇ is: 1
 a) +2 b) +4 c) +6 d) +12
10. The IUPAC name of CH₃-CH(OH)-CH₂-CHO is: 1
 a) 3-hydroxybutanal b) 2-hydroxybutanal
 c) 4-hydroxybutanal d) 1-oxo-3-butanol
11. Which of the following is most reactive towards electrophilic substitution? 1
 a) Benzene b) Toluene c) Nitrobenzene d) Chlorobenzene
12. Wurtz reaction of 2-iodopropane yields: 1
 a) hexane b) 2,3-dimethylpentane c) 2,3-dimethylbutane d) propane

Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- a) Both A and R are true, and R is the correct explanation of A.
 - b) Both A and R are true, but R is not the correct explanation of A.
 - c) A is true but R is false.
 - d) A is false but R is true.
13. **Assertion (A):** 1 mole of O₂ and 1 mole of O₃ have different masses. 1
Reason (R): Molar mass is the mass of 1 mole of a substance.

- | | | | |
|-----|-----------------------|---|---|
| 14. | Assertion (A): | Noble gases have zero electron gain enthalpy. | 1 |
| | Reason (R): | They have stable fully filled electronic configurations. | |
| 15. | Assertion (A): | Tertiary carbocations are more stable than primary ones. | 1 |
| | Reason (R): | This is due to the inductive effect and hyperconjugation. | |
| 16. | Assertion (A): | Alkanes are called paraffins. | 1 |
| | Reason (R): | They are highly reactive under ordinary conditions. | |

Section B

This section contains 5 questions with internal choice in one question. The following questions are very short answer type and carry 2 marks each.

- | | | |
|-----|--|---|
| 17. | Calculate the molality of a solution containing 20g of NaOH in 500g of water.
(density of pure water is 1g/cc) | 2 |
| 18. | Calculate the wavelength of a ball of mass 100 g moving with a velocity of 10 m/s.
($h = 6.626 \times 10^{-34} \text{ Js}$) | 2 |
| 19. | Attempt either option A or B | 2 |
| | A. | |
| | i) Define dipole moment. | |
| | ii) Why is BF_3 non-polar while NF_3 is polar? | |
| | OR | |
| | B. Predict the shape and hybridisation of XeF_2 and XeF_4 . | |
| 20. | Explain the reaction for the fusion of an organic compound with metallic sodium for testing nitrogen and sulphur. | 2 |
| 21. | Give the chemical equations for | 2 |
| | i) the decarboxylation of sodium acetate. | |
| | ii) the dehydrohalogenation of 2-bromobutane. | |

Section C

This section contains 7 questions. The following questions are short answer type and carry 3 marks each.

- | | | |
|-----|---|---|
| 22. | An organic compound on analysis gave the following percentage composition: C=40.68%, H=5.08% and rest are oxygen. The vapour density of the compound was found to be 59. Find out the molecular formula of the compound. | 3 |
| 23. | Define ionization enthalpy. Why is the first ionization enthalpy of Nitrogen higher than that of Oxygen? | 3 |
| 24. | Draw the Molecular Orbital (MO) diagram for O_2 and calculate its bond order. | 3 |
| 25. | Calculate the enthalpy of formation of acetic acid (CH_3COOH) if its enthalpy of combustion is -867 KJmol^{-1} . The enthalpies of formation of $\text{CO}_2(\text{g})$ and $\text{H}_2\text{O}(\text{l})$ are -393.5 and $-285.9 \text{ KJmol}^{-1}$ respectively. | 3 |
| 26. | The solubility product of $\text{Al}(\text{OH})_3$ is 2.7×10^{-11} . Calculate its solubility in g/L and also find out pH of this solution. (Atomic mass of Al = 27)
[Given $\log 3 = 0.4771$] | 3 |
| 27. | Balance the following redox reactions: | 3 |
| | i) $\text{MnO}_4^-(\text{aq}) + \text{I}^-(\text{aq}) \rightarrow \text{MnO}_2(\text{s}) + \text{I}_2(\text{s})$ [in basic medium] | |
| | ii) $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{C}_2\text{O}_4^{2-}(\text{aq}) \rightarrow \text{Cr}^{3+}(\text{aq}) + \text{CO}_2(\text{g})$ [in acidic medium] | |
| 28. | Draw the structure and write IUPAC name of each of the following: (Any three) | 3 |
| | i) Position isomer of butene | |
| | ii) Chain isomer of butane | |
| | iii) Functional group isomer of butanol | |
| | iv) Metamer of ethoxy ethane | |

Section D

The following questions are case -based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.

- | | | |
|-----|--|---|
| 29. | In chemical and biological systems, maintaining a specific hydrogen ion concentration ($[\text{H}^+]$) is often critical. Many biochemical reactions, such as those involving enzymes in the human body, only occur within a narrow pH range. To maintain this stability, we use buffer solutions. A buffer solution is defined as a solution that resists drastic changes in its pH upon the addition of small amounts of a strong acid or a strong base, or upon dilution. | 4 |
|-----|--|---|

Buffers typically consist of a mixture of a weak acid and its conjugate base (acidic buffer) or a weak base and its conjugate acid (basic buffer). For example, a mixture of acetic acid (CH_3COOH) and sodium acetate (CH_3COONa) acts as an acidic buffer. When a small amount of acid (H^+) is added, it reacts with the acetate ions to form undissociated acetic acid. Conversely, added base (OH^-) is neutralized by the acetic acid molecules.

The pH of such a solution can be calculated using the Henderson-Hasselbalch

$$\text{equation: } \text{pH} = \text{pK}_a + \log \frac{[\text{Salt}]}{[\text{Acid}]}$$

For pure water or strong acids, pH is simply the negative logarithm of the hydronium ion concentration ($\text{pH} = -\log[\text{H}_3\text{O}^+]$). Another important phenomenon in these systems is the common ion effect, which involves the suppression of the degree of dissociation of a weak electrolyte by the addition of a strong electrolyte containing a common ion.

- i) Define a buffer solution.
- ii) Calculate the pH of 10^{-3} M HCl.

Attempt either option iii or iv

- iii) Calculate the pH of a buffer solution containing 0.1 M acetic acid and 0.2 M sodium acetate. (Given: pK_a for acetic acid is 4.76 and $\log 2 = 0.3010$)

OR

- iv) Explain the common ion effect with an example.

30. The reactivity of organic molecules is rarely uniform across the entire carbon skeleton. It is usually concentrated at specific sites due to the displacement of electrons. These displacements can be permanent, such as the inductive effect, which arises from differences in electronegativity between bonded atoms, causing a "shiver" of charge along a σ -bond chain. Another crucial permanent effect is hyperconjugation (also known as the no-bond resonance), which involves the delocalization of σ -electrons of a C-H bond of an alkyl group directly attached to an atom of an unsaturated system or to an atom with an unshared p-orbital. Organic reactions occur when "attacking reagents" strike these electron-rich or electron-poor centers. Electrophiles are electron-deficient species (Lewis acids) that seek out high electron density, such as the π -electrons in an alkene. On the other hand, nucleophiles are electron-rich species (Lewis bases) that possess at least one lone pair of electrons and attack positive or electron-deficient centers. The stability of reaction intermediates, like carbocations, is heavily dictated by these electronic effects.

- i) Identify the electrophile and nucleophile in the following reaction:

$$\text{CH}_3\text{Br} + \text{OH}^- \rightarrow \text{CH}_3\text{OH} + \text{Br}^-$$
- ii) Which effect is responsible for the stability of a tertiary butyl carbocation $(\text{CH}_3)_3\text{C}^+$ compared to a methyl carbocation CH_3^+ ?

Attempt either option iii or iv

- iii) Between $\text{CH}_3\text{CH}_2\text{-Cl}$ and $\text{CH}_3\text{CH}_2\text{-I}$, which molecule has a stronger inductive effect and why?

OR

- iv) Explain why chloroacetic acid (ClCH_2COOH) is a stronger acid than acetic acid (CH_3COOH).

Section E

The following questions are long answer type and carry 5 marks each. All the questions have an internal choice each.

31. **Attempt either option A or B**

5

- A.i) State Heisenberg's uncertainty principle. A golf ball has a mass of 40g and a speed of 45 m/s. If the speed can be measured with an accuracy of 2%, calculate the uncertainty in position.
- ii) Calculate the energy of one mole of photons of radiation whose frequency is 5×10^{14} Hz. ($h = 6.626 \times 10^{-34}$ Js).

OR

- B.i) What are the limitations of Bohr's model of an atom? (Mention at least two).
- ii) Calculate the wavelength of the spectral line emitted when an electron in a hydrogen atom undergoes a transition from $n=4$ to $n=2$. In which region of the electromagnetic spectrum does this radiation fall? (Rydberg constant $R_H = 109,677 \text{ cm}^{-1}$)

32. **Attempt either option A or B** 5
- A.i) Derive the relationship between enthalpy change (ΔH) and internal energy change (ΔU) for a gaseous reaction: $\Delta H = \Delta U + RT\Delta n_g$.
- ii) For the reaction: $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, calculate the value of Δn_g .
- iii) Under what condition does $\Delta H = \Delta U$?
- OR**
- B.i) State the first law of thermodynamics. Write the mathematical expression for it.
- ii) 5 moles of an ideal gas expand isothermally and reversibly from a volume of 2L to 20L at 27°C. Calculate the work done (w).
(Given: $R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$)
33. **Attempt either option A or B** 5
- A.i) Explain the mechanism of nitration of benzene. Write the chemical equations for the generation of the nitronium ion.
- ii) How will you convert:
- a) ethyne to benzene
- b) benzene to acetophenone
- OR**
- B.i) Define Hückel's rule of aromaticity. Use it to explain why cyclopentadienyl anion is aromatic while cyclopentadiene is not.
- ii) How will you convert:
- a) phenol to benzene?
- b) benzene to m-nitrochlorobenzene?
- c) propene to 1-bromopropane?

BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN
ANNUAL EXAMINATION: (2025 – 2026)
COMPUTER SCIENCE
CLASS: XI

Time: 3 Hours**Maximum Marks: 70**

NAME:_____ **SEC.:**_____ **ROLL NO.:**_____

General Instructions:

- This question paper contains 37 questions.
- All questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions
- The paper is divided into 5 Sections- A, B, C, D and E.
- Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
- Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
- Section C consists of 3 questions (29 to 31). Each question carries 3 Marks.
- Section D consists of 4 questions (32 to 35). Each question carries 4 Marks.
- Section E consists of 2 questions (36 to 37). Each question carries 5 Marks.
- All programming questions are to be answered using Python Language only.
- In case of MCQ, text of the correct answer should also be written.

SECTION – A (1 X 21 = 21 MARKS)

- | | | |
|-----|--|---|
| 1. | Main component of Static RAM is | 1 |
| | a) Transistors b) Capacitors c) Flip-flops d) Resistors | |
| 2. | State True or False:
The blue-violet laser used in Blu-ray Disk has shorter wavelength than the red laser. | 1 |
| 3. | Which out of these is not considered as a utility program? | 1 |
| | a) Language processor b) Text editor c) Defragmenter d) Antivirus | |
| 4. | Convert $(9F2.5C)_{16}$ to binary equivalent. | 1 |
| 5. | Expand ISCI. | 1 |
| 6. | Which out of these is the Absorption law? | 1 |
| | a) $x + y = y + x$ b) $x(x + y) = x$ c) $x \cdot y = y \cdot x$ d) $x + xy = x + y$ | |
| 7. | State the distributive law. (Any one) | 1 |
| 8. | The smallest individual unit in a program is known as | 1 |
| | a) Keywords b) Literals c) Token d) Identifiers | |
| 9. | Identify the invalid identifier out of the following: | 1 |
| | a) a13 b) break c) CHK d) Date9-7-77 | |
| 10. | What will be the output of the following:
$7.2 \% 3 * 10 + 10 - 10$ | 1 |
| | a) 20 b) 12.0 c) 12 d) 20.0 | |
| 11. | A bitwise complement is represented by _____ symbol. | 1 |
| | a) & b) c) ^ d) ~ | |
| 12. | $l = [1, 3, 5]$
<code>l.append(12, 14)</code>
What will be the output of the following? | 1 |
| | a) [1, 3, 5, 12, 14] b) [12, 14] c) TypeError d) ValueError | |
| 13. | Which is a tuple membership operator? | 1 |
| | a) in b) is c) in not d) not is | |
| 14. | This dictionary function removes and returns the dictionary element associated to passed key name. The function is | |
| | a) del() b) popitem() c) pop() d) remove() | |
| 15. | _____ are the programs that deliver unwanted ads to your computer. | 1 |
| | a) Spyware b) Adware c) Spam d) Malware | |

16. _____ is an attempt where a hacker tries to divert network traffic to a bogus site. 1
 a) Spoofing b) Phishing c) Pharming d) Eavesdropping
17. For how long a Patent can protect a user's IPR? 1
 a) 20 years b) 1 year c) 10 years d) Lifetime
18. How many types of Creative Commons licenses are there? 1
 a) 2 b) 4 c) 10 d) 6
19. Autism is an example of _____ disability/impairment. 1
 a) Locomotor b) Cognitive c) Hearing d) Vision

ASSERTION AND REASON:

In the following questions, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Mark the correct choice as

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is True but R is False
 (d) A is false but R is True
20. **Assertion (A):** Open source software makes available the source code of a software. 1
Reason (R): A free software means the freedom to use a software.
21. **Assertion (A):** A software firewall is a special type of computer software running on a 1
 computer.

Reason (R): Antivirus is one of the software firewalls.

SECTION – B (2 x 7 = 14 MARKS)

22. Write a program to obtain temperature in Celsius and convert it into Fahrenheit using 2
 formula

$$C \times 9/5 + 32 = F$$

OR

Define cache memory.

23. Define type casting. Give an example of it. 2

24. Consider the following code: 2

```
import random
AR = [20, 30, 40, 50, 60, 70]
FROM = random.randint(1, 3)
TO = random.randint(2, 4)
for k in range(FROM, TO + 1):
    print(AR[k], end = '#')
```

Predict the output of the code from the given options:

- i) 10#40#70# ii) 30#40#50# iii) 50#60#70# iv) 40#50#70#

Also specify the maximum value that can be assigned to each of the variables **FROM** and **TO**.

25. WAP to take a string **"PYTHON"** as input and traverse through the string with a \$ symbol 2
 between each character.

OR

Convert **(75624.568)₈** to hexadecimal and binary. 1+1

26. WAP to take a list as input from the user and print the elements in the odd index of the 2
 list.

OR

Write any four practices to be used to ensure confidentiality of information.

27. WAP to check if a tuple contains any duplicate element. 2

OR

What is Copyright Infringement? Give any two examples.

28. WAP to check if the year entered by the user is a leap year or not. 1+1

OR

What is the use of **fromkeys()** method in dictionary? 2

SECTION – C (3 x 3 = 9 MARKS)

29. Design a logic circuit and draw its diagram for the Boolean expression: 3
 $Q = AB + BC(B + C)$

30. What advantages do tuples have over lists? 3

OR

WAP to generate two random integers between **450** and **950**. Print these numbers along with their average.

31. Name and explain **three types of errors** in a program. 3

OR

WAP to input a list **lst** and two numbers **M** and **N**. Then create a list from those list elements which are divisible by both **M** and **N**.

SECTION – D (4 x 4 = 16 MARKS)

32. WAP to find the frequency of all the elements of a list. Also, print the list of unique elements and duplicate elements in the list. The list is to be taken as input by the user. 1+3

OR

What are the differences between **sort()** and **sorted()** functions in a list?

33. WAP to take a number as input and check whether the number is **prime** or not. 4

34. Define digital footprints. Name and explain the two types of digital footprints. 4

OR

Define computer forensics. List three practices followed by computer forensics.

35. Write any four benefits of e-waste recycling. 4

SECTION – E (5 x 2 = 10 MARKS)

36. Write a program to find the sum of the given series: $1 + 1/8 + 1/27 + \dots + 1/n^3$ 5
where **n** is the number input given by the user.

37. Consider the following string **myData**: 5

`myData = "Digital India 2026"`

What will be the output of the following string operations:

- i. `print(myData[0:7])`
- ii. `print(myData[-4:])`
- iii. `print(myData[::2])`
- iv. `print(myData[::-1])`
- v. `print(myData.upper())`
- vi. `print(myData.lower())`
- vii. `print(myData.count('i'))`
- viii. `print(myData.find('India'))`
- ix. `print(myData.replace('2026', '2030'))`
- x. `print(myData.isalpha())`

BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN
ANNUAL EXAMINATION: (2025 – 2026)
INFORMATION TECHNOLOGY
CLASS: XI

Time: 3 Hours

Maximum Marks:60

Name: _____ Sec.: ____ Roll No.: ____

General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **24 questions** in two sections– Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. **Out of the given (6 +18 =) 24 questions, a candidate has to answer (6 +11=) 17 questions in the allotted (maximum) time of 3 hours.**
5. All questions of a particular section must be attempted in the correct order.

SECTION A-OBJECTIVE TYPE QUESTIONS (30 MARKS):

This section has 06 questions.

There is no negative marking.

Do as per the instructions given.

Marks allotted are mentioned against each question/part.

SECTION B-SUBJECTIVE TYPE QUESTIONS (30 MARKS):

This section contains 18 questions.

A candidate has to do 11 questions.

Do as per the instructions given.

Marks allotted are mentioned against each question/part.

SECTION A: OBJECTIVE TYPE QUESTIONS**1. Answer any 4 out of the given 6 questions on Employability Skills: (1 X 4 = 4 marks)**

- | | | |
|------|---|----------|
| i. | During an interview, Meena maintains eye contact and sits upright while answering questions. What does this body language indicate? | 1 |
| | (a) Nervousness (b) Confidence (c) Confusion (d) Aggression | |
| ii. | Rohan studies hard because he wants to score good marks and make his parents proud. This type of motivation is: | 1 |
| | (a) Internal (b) External (c) Negative (d) No motivation | |
| iii. | Aman wants to list items without showing any specific order in a document. Which list should he use? | 1 |
| | (a) Numbered list (b) Multilevel list (c) Bulleted list (d) Table | |
| iv. | Which part of LibreOffice Writer shows the current page style and language? | 1 |
| | (a) Title Bar (b) Menu Bar (c) Status Bar (d) Tool Bar | |
| v. | A company providing online food delivery services is an example of: | 1 |
| | (a) Manufacturing business (b) Trading business
(c) Service business (d) Agricultural business | |
| vi. | Which Green Skill focuses on reducing waste and reusing resources? | 1 |
| | (a) Renewable energy (b) 3R principle (c) Organic farming (d) Water harvesting | |

2. Answer any 5 out of the given 7 questions: (1 X 5 = 5 marks)

- | | | |
|------|--|----------|
| i. | Which memory is fastest in a computer system? | 1 |
| | (a) Hard Disk (b) Cache Memory (c) RAM (d) ROM | |
| ii. | Which device is used to permanently store data? | 1 |
| | (a) RAM (b) Hard Disk (c) Cache Memory (d) Register | |
| iii. | _____ software controls the overall operation of a computer. | 1 |
| iv. | The speed of CPU is measured in _____. | 1 |
| v. | Which utility software protects the system from malicious programs? | 1 |
| | (a) Disk Cleanup (b) Antivirus (c) Backup (d) Compression | |
| vi. | Which operating system allows multiple users to work on a computer at the same time? | 1 |

- (a) Single-user OS (b) Batch OS (c) Multi-user OS (d) Real-time OS
- vii. In time-sharing systems, CPU time is: 1
 (a) Given to one user only (b) Shared among users (c) Not shared (d) Wasted
3. **Answer any 6 out of the given 7 questions:** **(1 X 6 = 6 marks)**
- i. Which view shows slides in thumbnail form in Impress? 1
 (a) Normal View (b) Notes View (c) Slide Sorter View (d) Outline View
- ii. A _____ is a small program used to automate tasks in applications. 1
- iii. Which chart is best for showing parts of a whole? 1
 (a) Line (b) Column (c) Pie (d) Area
- iv. Which addressing type changes when copied both row and column-wise? 1
 (a) Absolute (b) Relative (c) Mixed (d) Fixed
- v. Which symbol is used to start a formula in Calc? 1
 (a) + (b) # (c) = (d) \$
- vi. Define Primary Key? 1
- vii. **True or False:** Paste command places copied content at cursor position. 1
4. **Answer any 5 out of the given 6 questions:** **(1 X 5 = 5 marks)**
- i. Which key uniquely identifies each record in a table? 1
 (a) Candidate Key (b) Foreign Key (c) Primary Key (d) Alternate Key
- ii. Which SQL command is used to remove records from a table? 1
 (a) DROP (b) DELETE (c) REMOVE (d) CLEAR
- iii. A column in a table is known as _____. 1
- iv. Which constraint prevents duplicate values? 1
 (a) NOT NULL (b) UNIQUE (c) DEFAULT (d) CHECK
- v. Which SQL clause is used to filter records? 1
 (a) WHERE (b) FROM (c) GROUP BY (d) ORDER BY
- vi. The relationship between tables is created using _____ key. 1
5. **Answer any 5 out of the given 6 questions:** **(1 X 5 = 5 marks)**
- i. GUI stands for: 1
 (a) General User Interface (b) Graphical User Interface
 (c) Global User Interaction (d) Graphical Utility Interface
- ii. The _____ component allows us to accept multiline input from the user or display multiple line information in Java. 1
- iii. Which OOP concept allows one class to acquire properties of another? 1
 (a) Encapsulation (b) Polymorphism (c) Inheritance (d) Abstraction
- iv. Which operator is used for comparison in Java? 1
 (a) = (b) == (c) := (d) +=
- v. Which data type stores true or false values? 1
 (a) int (b) char (c) boolean (d) float
- vi. **True or False:** Java is platform dependent. 1
6. **Answer any 5 out of the given 6 questions:** **(1 X 5 = 5 marks)**
- i. Given the following information: 1
 int a = 11; int b = 22; int c = 33; int d = 11;
 Which of the following statements is true :
 (a) a==b (b) b <= d (c) c >= b (d) c <= a
- ii. Which of the following is not an arithmetic operator in Java? 1
 (a) + (b) - (c) * (d) &&
- iii. Which symbol is used to make a cell address absolute? 1

- a) % b) \$ c) = d) &
- iv. **True or False:** Variable names in Java are case sensitive. **1**
- v. Which message is displayed in MySQL when the following SQL code is executed? **1**
mysql> USE BRS; (Here BRS is the name of the database)
- vi. Expand DDL. **1**

SECTION B: SUBJECTIVE TYPE QUESTIONS

Answer any 3 out of given 5 questions on Employability Skills (2 X 3 = 6 marks)

Answer each questions in 20-30 words.

7. Explain any two barriers to effective communication. **2**
8. How does self-discipline help in personal growth? **2**
9. Why is stress management important for students? **2**
10. What is entrepreneurship? Mention any two qualities of an entrepreneur. **2**
11. Elaborate RRRR in Green Skills. **2**

Answer any 3 out of the given 5 questions:

(2X3=6 marks)

12. What is system software? Give two examples. **2**
13. Write two advantages of computer networking. **2**
14. What is the use of Find and Replace feature in a word processor? **2**
15. Differentiate between primary key and foreign key. **2**
16. What is the difference between = and == in Java? **2**

Answer any 2 out of the given 3 questions:

(3X2= 6 marks)

17. Explain any three features of spreadsheet software. **3**
18. Describe SELECT and UPDATE commands with examples. **3**
19. Identify valid and invalid variable names in Java with reasons: 2value, total_marks, class, studentAge **3**

Answer any 3 out of the given 5 questions:

(4X3= 12 marks)

20. Write SQL queries for a STUDENT table to: **4**
 (a) Insert records
 (b) Update marks
 (c) Display records in ascending order
 (d) Describe table structure
21. Neha wrote the following Java code to check if a number is even or odd, but it contains errors. Identify the errors and rewrite the correct code: **2+2**
 If(num / 2 = 0)
 {
 jTextField2.setText("Even Number")
 }
 else
 {
 jTextField2.setText("Odd Number")
 }
22. Explain slide transitions and animations in OpenOffice Impress. **4**

23. We have a table named 'BOOKSTORE' with following data:

2 + 2

BookID	BookTitle	Author	Price (Rs.)
B001	Harry Potter and the Sorcerer's Stone	J.K. Rowling	450
B002	The Monk Who Sold His Ferrari	Robin Sharma	600
B003	Malgudi Days	R.K. Narayan	250
B004	India After Gandhi	Ramachandra Guha	800
B005	Midnight's Children	Salman Rushdie	650

Write SQL commands for following Tasks:

- Delete row with BookId 'B005' .
- Change Price of Book – Malgudi Days from Rs.250 to Rs.500.
- Display only the BookTitles field in descending order according to price.
- To view the structure of Table : BOOKSTORE.

24. Suppose you are designing a GUI-based calculator in Java.

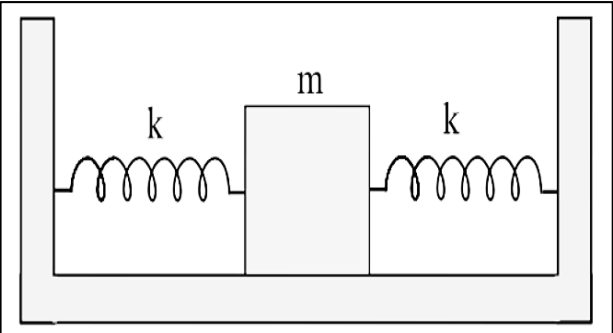
3 + 1

- Name the components and their number which will be used for the same.
- Write the command which will reset all the entered value and results.

DATE OF EXAM: 16/02/2026			CODE 042
BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN ANNUAL EXAMINATION: (2025-2026) PHYSICS CLASS: XI			
Time: 3 Hours			Maximum Marks: 70
NAME: _____		SEC.: _____	ROLL NO.: _____
	General Instructions: (i) There are 33 questions in all. All questions are compulsory. (ii) This question paper has five sections: Section A, Section B Section C, Section D and Section E. (iii) All the sections are compulsory. (iv) Section A contains sixteen questions, twelve MCQ and four Assertion Reasoning based of 1 mark each, Section B contains five questions of two marks each, Section C contains seven questions of three marks each, Section D contains two case study-based questions of four marks each and Section E contains three long answer questions of five marks each. (v) There is no overall choice. However, an internal choice has been provided in one question in Section B, one question in Section C, one question in each CBQ in Section D and all three questions in Section E. You have to attempt only one of the choices in such questions. (vi) Use of calculator is not allowed.		
SECTION - A			
1.	The number of significant figures in 0.00564 and 0.54600 are – (a) 5 & 5 (b) 3 & 5 (c) 5 & 3 (d) 3 & 3		1
2.	A man throws balls vertically upwards at the same speed, one after the other, with a 2 second interval. What should the throw speed be if more than two balls are in the air at the same time? (a) Only with speed 19.6 m/s (b) More than 19.6 m/s (c) At least 9.8 m/s (d) Any speed less then 19.6 m/s		1
3.	The times of flight of two projectiles are t_1 and t_2 . If R be the horizontal range of each of them, then – (a) $t_1 t_2 \propto R^2$ (b) $t_1 t_2 \propto R^3$ (c) $t_1 t_2 \propto R^{1/2}$ (d) $t_1 t_2 \propto R$		1
4.	A car moving with a speed of 50 km/hr can be stopped by brakes, over a distance of 6 m. If the same car is moving at a speed of 100 km/hr, the stopping distance is - (a) 12 m (b) 18 m (c) 6 m (d) 24 m		1
5.	Two bodies of masses 4 kg and 5 kg are moving with equal momentum. Then the ratio of their respective kinetic energies is – (a) 4 : 5 (b) 2 : 1 (c) 1 : 3 (d) 5 : 4		1
6.	A wheel of radius R rolls on a ground with a uniform velocity v. The velocity of the topmost point relative to the bottommost point is - (a) v (b) 2v (c) v/2 (d) zero		1
7.	The escape velocity of a planet is v_e . From this planet a particle is projected upwards with a velocity v. The particle will revolve like a satellite if - (a) $\frac{v_e}{\sqrt{2}} < v < 2v_e$ (b) $\frac{v_e}{\sqrt{2}} < v < v_e$ (c) $v_e < v < \sqrt{2}v_e$ (d) $\frac{v_e}{\sqrt{2}} < v < \frac{v_e}{2}$		1
8.	Keeping the length of a wire unchanged, its diameter is doubled. Young's modulus for the material of the wire will – (a) increase (b) decrease (c) remain same (d) unpredictable		1
9.	A small metal sphere of radius r and density ρ falls from rest in a viscous liquid of density σ and coefficient of viscosity η . Due to friction heat is produced. The rate of production of heat when the sphere has acquired the terminal velocity is proportional to – (a) r (b) r^3 (c) r^4 (d) r^5		1
10.	In an adiabatic expansion, the change in internal energy of 10 mole of a gas is 100 J. What is the amount of work done by the gas? (a) -100 J (b) 100 J (c) 1000 J (d) -1000 J		1
11.	A certain amount of gas is at 27°C. The RMS speed of the gas molecules become double at –		1

		(a) 327°C (b) 600°C (c) 927°C (d) 1200°C	
12.		The amplitude of vibration of the SHM represented by the equation $x = A \sin(\omega t) + B \cos(\omega t)$ is – (a) $(A + B)$ (b) $(A - B)$ (c) $\sqrt{A^2 + B^2}$ (d) $\sqrt{A^2 - B^2}$	1
		For Questions 13 to 16, two statements are given –one labelled Assertion (A) and other labelled Reason (R). Select the correct answer to these questions from the options as given below. a) If both Assertion and Reason are true and Reason is correct explanation of Assertion. b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion. c) If Assertion is true but Reason is false. d) If both Assertion and Reason are false.	
13.		Assertion(A): A body moving in a circular path with constant speed has zero acceleration. Reason(R): Acceleration is defined as the rate of change of speed of the body.	1
14.		Assertion(A): The driver of a moving car sees a wall in front of him. To avoid collision he should apply brakes rather than take a turn away from the wall. Reason(R): Force of friction is needed to stop the car or take a turn on a horizontal road.	1
15.		Assertion(A): A cyclist always bends inwards while negotiating a curve. Reason(R): By bending, the cyclist lowers his centre of gravity.	1
16.		Assertion(A): Moment of inertia of a ring is higher than that of a disk of same mass. Reason(R): Mass distribution is farther from the axis in case of ring than that of the disk.	1
		SECTION – B	
17.		A boat with a speed of 5 km/h in still water crosses a river of width 1 km along the shortest possible path in 15 minutes. What is the velocity of the river water?	2
18.	A.	Attempt either option A or B. A stone of mass m tied with a thread is rotating along a horizontal circular path. (Neglect force of gravity) The length of the thread is decreasing gradually in such a manner that the angular momentum of the stone remains constant with respect to the centre of the circle. If the tension in the thread is given by $T = Ar^n$, where $A = \text{constant}$ and $r = \text{instantaneous radius of the circle}$, then find the value of n .	2
		OR	
	B.	A solid sphere of diameter 2 cm and mass 20 g is rolling with a velocity of 3 cm.s^{-1} . What is the total kinetic energy of the sphere?	
19.		If both the radius and the mean density of a planet are half the radius and mean density of the Earth, what will be the acceleration due to gravity on the surface of that planet? (Given that the acceleration due to gravity on the Earth's surface = 980 cm.s^{-2})	2
20.		If two moles of a gas at constant pressure requires 70 cal heat to increase its temperature from 30°C to 35°C, then find its degrees of freedom.	2
21.		A wave having frequency of 200 Hz is advancing with velocity 40 ms^{-1} . What is the phase difference of two particles separated by 5 cm in the direction of the wave motion?	2
		SECTION – C	
22.		The Reynold's number R_n for a liquid flowing through a pipe depends upon: (i) the density of the liquid ρ , (ii) the coefficient of viscosity η , (iii) the speed of flow of the liquid v , and (iv) the radius of the tube r . Obtain dimensionally an expression for R_n . Given, R_n is directly proportional to r .	3

23.		A train A of length 200 m starts from rest at station X and accelerates uniformly at 2 m/s^2 along a straight track towards station Y, which is 2 km away. Another train B of length 150 m is approaching from Y towards X, moving with a constant velocity of 20 m/s. Train B is initially 1.5 km away from X when train A starts. Calculate the time after which the two trains meet (when their fronts meet), and the position from station X at that instant.	3
24.		A block of mass 2 kg is released from rest at the top of a frictionless inclined plane of height 5 m and length 10 m. At the bottom of the incline, it collides elastically with another stationary block of mass 3 kg on a rough horizontal surface where the coefficient of kinetic friction is $\mu_k = 1/5$. After collision, the second block moves a distance d before coming to rest. Find the velocities of both blocks immediately after the elastic collision using conservation of momentum and conservation of kinetic energy.	3
25.		Draw the stress-strain graph for a elastic material and mark the followings – a. Proportional limit b. Elastic limit d. Plastic region e. Breaking point	3
26.		A hydraulic lift system consists of two connected cylinders: a smaller one with cross-sectional area $A_1 = 0.02 \text{ m}^2$ and a larger one with $A_2 = 2 \text{ m}^2$. A block of wood (density $\rho = 600 \text{ kg/m}^3$, volume $V = 0.1 \text{ m}^3$) floats in the larger cylinder filled with water (density $\rho' = 1000 \text{ kg/m}^3$). A force of 500 N is applied to the piston in the smaller cylinder. Determine the apparent weight of the floating wooden block and the height to which it rises due to the pressure increase (assume negligible piston weight).	3
27.	A.	Attempt either option A or B. Prove that the work done in a adiabatic process is given by, $W = \frac{nR}{\gamma-1}(T_{in} - T_f)$.	3
		OR	
	B.	(i) What is a reversible process?	
		(ii) A heat engine has an efficiency of 60%. If the source is at 527°C , then find the temperature of the sink.	
28.		If string wires of same material of length l and 2l vibrate with frequencies 100 Hz and 150 Hz, find the ratio of the tension applied on the strings.	3
		SECTION – D	
29.		When a body is projected in effect of gravity in such a manner, that its path is parabolic, is called projectile motion. When a body is thrown at an angle from horizontal then motion under gravity is known as oblique projectile motion. Vertical component of velocity is zero when particle moves horizontally i.e., at the highest point of trajectory. The time taken by projectile between point of projection and point of impact is known as time of flight. It was Galileo who first stated the principle of physical independence of the horizontal and vertical motion of a projectile. All projectile will go upto the maximum horizontal distance, if it is projected at a certain angle with the horizontal.	4
	(i)	What is the trajectory of a projectile with respect to another when both are projected from the same point and in same vertical plane?	
	(ii)	At which point of a projectile, the kinetic energy is minimum?	
	(iii)	Attempt either option A or B. A. Find the ratio of the maximum height attained by two projectiles thrown with same velocity but angles of projection are θ and $(90^\circ - \theta)$.	
		OR	
		B. If the momentum of a projectile at the highest point become $\sqrt{3}/2$ times its initial momentum, then find the angle of projection.	

30.		Two identical springs of spring constant k are attached to a block of mass m and to fixed supports as shown in the figure beside. Consider that the block is shifted along one side to produce extension of x on both the springs. 	4
	(i)	What is the net force acting on mass m? (a) kx (b) $-kx$ (c) $2kx$ (d) $-2kx$	
	(ii)	The force on one side trying to pull or push the block is - (a) kx (b) $-kx$ (c) k/x (d) $-k/x$	
	(iii)	What is the total energy of this system, if A is the amplitude? (a) kA^2 (b) $1/2 kA^2$ (c) $2kA^2$ (d) $3/2 kA^2$	
	(iv)	Attempt either option A or B. A. If the mass is 80kg and the spring constant is 10 Nm^{-1}, then what is the time period of oscillation(T)? (a) π (b) 2π (c) 4π (d) 8π	
		OR	
		B. What is the angular speed of oscillation(ω), if $k = 40\text{ Nm}^{-1}$ and mass is 20 kg? (a) 1 rads^{-1} (b) 2 rads^{-1} (c) 4 rads^{-1} (d) 8 rads^{-1}	
		SECTION – E	
31.	(i)	Derive an expression of the maximum speed with which a vehicle can take a turn on a banked road (with co-efficient of friction μ) with banking angle θ .	5
	(ii)	A circular racetrack of radius 300 m is banked at an angle of 15°. If the coefficient of friction between the wheels of a race-car and the road is 0.2, then find the optimum speed of the race-car to avoid wear and tear on its tyres. (Given $\tan 15^\circ = 0.27$)	
		OR	
	(i)	Find the angle made by the following vectors with the X axis – a. $3\mathbf{i} + 4\mathbf{j}$ b. $5\mathbf{i} - 12\mathbf{j}$ c. $15\mathbf{i} + 8\mathbf{j}$.	
	(ii)	A rigid ball of mass 200 g strikes a rigid wall at 60° and gets reflected without loss of speed which was 54 kmh^{-1} . Find the value of impulse imparted by the wall on the ball.	
32.	(i)	Define gravitational potential.	5
	(ii)	A particle of mass M is situated at the centre of a spherical shell of same mass and radius R . What will be the gravitational potential at a point situated at $R/2$ distance from the centre?	
	(iii)	Write two differences between gravitational potential and gravitational potential energy .	
		OR	
	(i)	What is the basic assumption for defining acceleration due to gravity.	
	(ii)	Derive the expression of acceleration due to gravity at a depth d below the Earth's surface.	
	(iii)	Find out the height above the Earth's surface where the value of ' g ' will become 4% of its value on the surface. (Radius of the Earth is 6400 km)	
33.		Define the following terms and write their dimensions. a. Thermal conductivity b. Specific heat capacity c. Thermal stress d. Temperature gradient e. Emissivity	5
		OR	
	(i)	State Wien's displacement for the radiation of a body and plot the graphical representation of it for three different temperatures mentioning their order.	

	(ii)	Find out the equivalent thermal conductivity of a parallel composite slab consisting of two different materials having equal thickness and thermal conductivities K and $2K$ respectively.	
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MARKING SCHEME

Q. No.	ANSWER
Bunpur Riverside School, Chittaranjan	
class - <u>XI</u> (2024-2025).	
Mathematics.	
Annual Exam.	
<u>sec - A</u>	
1.	d
2.	d
3.	C
4.	d
5.	b
6.	C
7.	b.
8.	b.
9.	C
10.	C
11.	a.
12.	b.
13.	c.
14.	C.
15.	a
16.	C
17.	C
18.	a
19.	d.
20.	a.

Section - B

(5 questions of 2 marks).

2. $A' = \{1, 4, 5, 6\}$, $B' = \{1, 2, 6\}$

a) $A' \cap B' = \{1, 6\}$

OR

$$b) \quad x^2 + 7x - 8 = 0 \Rightarrow x^2 + 8x - x - 8 = 0 = (x+8)(x-1) = 0, x = 1, -8$$

$$C = [1, -8]$$

MARKING SCHEME

Q. No.	ANSWER	Value Points
	OR	
22)	Number of revolution made in 1 second = $\frac{360}{6} = 6$ We know that 1 round makes $360^\circ = 2\pi^\circ$ 6 " " " $6 \times 2\pi^\circ = 12\pi^\circ$	1 1
23)		
25	Evaluate : $\lim_{n \rightarrow 0} \frac{a + n \cos n}{b \sin n}$ $= \lim_{n \rightarrow 0} \frac{a + \cos n}{b \left(\frac{\sin n}{n} \right)}$ $= \frac{a+1}{b \times 1} = \frac{a+1}{b}$	1 1
	OR.	
	$\lim_{n \rightarrow 0} \frac{3^n + 3^{-n} - 2}{n^2}$ $= \lim_{n \rightarrow 0} \frac{3^{2n} - 2 \times 3^n + 1}{3^n \times n^2}$ $= \lim_{n \rightarrow 0} \left(\frac{3^n - 1}{n} \right)^2 \times \frac{1}{3^n}$ $= (\log_e 3)^2 \times \left(\frac{1}{3} \right)^0 = (\log_e 3)^2$	1 1
26	The two sides pass through (2, 2) and make an angle of 45° with the line $3x + 4y = 4$. So the eqn ^s are given by $y - 2 = \frac{-3 \pm \tan \pi/4}{1 \pm (-3/4) \tan \pi/4} (x - 2)$	1

MARKING SCHEME

Q. No.

ANSWER

$$y-2 = \frac{-3 \pm 1}{1 \pm \left(-\frac{3}{4}\right)} (x-2)$$

$$(y-2) = \frac{-3 \pm 4}{4 \mp (+3)} (x-2)$$

$$y-2 = \frac{-3+4}{4+3} (x-2)$$

$$y-2 = \frac{-3-4}{4+3} (x-2)$$

$$y-2 = -\frac{1}{7} (x-2)$$

$$y-2 = -\frac{7}{7} (x-2)$$

$$7y - x = 0$$

$$\Rightarrow 7y - 14 = -x + 2$$

$$7y$$

$$\Rightarrow x + 7y - 16 = 0$$

24. No of triangles = ${}^6C_3 = \frac{6!}{3!3!} = 20$

Egn are $7x + y - 16 > 0$

$x - 7y + 12 > 0$ Sec BC

24. Out of 9 students 4 students

26. can be selected in 9C_4 ways.

10 total no of elementary events = 9C_4

There are 4 boys and 5 girls out of which 2 boys and 2 girls can be selected in ${}^4C_2 \times {}^5C_2$ ways.

$\therefore$ favorable no of elementary events = ${}^4C_2 \times {}^5C_2$

$\therefore$ required probability

$$= \frac{{}^4C_2 \times {}^5C_2}{{}^9C_4}$$

$$= \frac{10}{21}$$

MARKING SCHEME

Q. No.	ANSWER	Value Points
	<u>Section - C</u>	
27.	$\tan 3n = \tan (2n + n).$ $= \frac{\tan 2n + \tan n}{1 - \tan 2n \tan n}$ $\tan 3n - \tan 3n \tan 2n \tan n = \tan 2n + \tan n$ $\Rightarrow \tan 3n - \tan 2n - \tan n$ $= \tan 3n \tan 2n \tan n.$ OR $\cos 570^\circ \sin 510^\circ + \sin (-330^\circ) \cos (-390^\circ)$ $= \cos 570^\circ \sin 510^\circ + [-\sin 330^\circ] \cos 390^\circ$ $= \cos 570^\circ \sin 510^\circ - \sin 330^\circ \cos 390^\circ$ $= \cos (90^\circ \times 6 + 30^\circ) \sin (90^\circ \times 5 + 60^\circ)$ $- \sin (90^\circ \times 3 + 60^\circ) \cos (90^\circ \times 4 + 30^\circ)$ $= -\cos 30^\circ \sin 60^\circ \cos 60^\circ + \cos 60^\circ \cos 30^\circ$ $= 0.$	1 1 1 1 1 1
28.	$\frac{d}{dn} \left(\frac{\sin(n+a)}{\cos n} \right)$ $= \frac{d}{dn} \left(\frac{\sin n \cos a + \cos n \sin a}{\cos n} \right)$ $= \frac{d}{dn} (\cos a \tan n + \sin a)$ $= \cos a \frac{d}{dn} (\tan n) + 0.$ $= \sec^2 a \cos a.$	1 1 1 1
29.	The eqnⁿ of the family of lines through the intersection of the lines $n-y+1=0$ and $2n-3y+5=0$ is $(n-y+1) + \lambda (2n-3y+5) = 0$ or, $n(2\lambda+1) + y(-3\lambda-1) + 5\lambda+1=0.$ This is at a distance of $7/5$ units from the point $(3, -2)$ $\frac{ 3(2\lambda+1) + 2(-3\lambda-1) + 5\lambda+1 }{\sqrt{(2\lambda+1)^2 + (-3\lambda-1)^2}} = \frac{7}{5}$ $\Rightarrow \frac{ 5\lambda+2 }{\sqrt{13\lambda^2+10\lambda+2}} = \frac{7}{5}$	1 1

MARKING SCHEME

Q. No.

ANSWER

$$\Rightarrow 25(5\lambda+2)^2 = 49(13\lambda^2+10\lambda+2)$$

$$\Rightarrow 6\lambda^2 - 5\lambda - 1 = 0$$

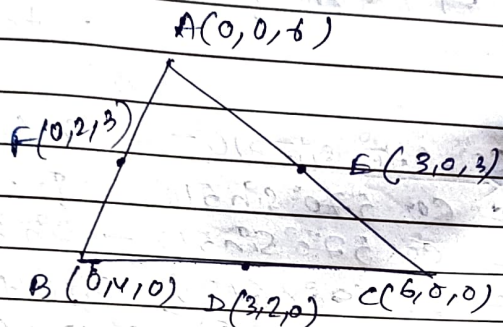
$$\Rightarrow \lambda = 1, -\frac{1}{6}$$

Substituting the values of λ in (i) -

$$\left. \begin{aligned} 3x - 4y + 6 &= 0 \\ 4x - 3y + 1 &= 0 \end{aligned} \right\}$$

30.

Let D, E, F
mid-points
of sides
BC, CA and AB
respectively.



Coordinate of D, E and F are

$$\left(\frac{0+6}{2}, \frac{4+0}{2}, \frac{0+0}{2} \right) = (3, 2, 0)$$

$$\left(\frac{6+0}{2}, \frac{0+0}{2}, \frac{0+6}{2} \right) = (0, 2, 3)$$

E and F (0, 2, 3) respectively.

$$AD = \sqrt{(0-3)^2 + (0-2)^2 + (6-0)^2} = \sqrt{9+4+36} = 7$$

$$BE = \sqrt{(0-3)^2 + (4-0)^2 + (0-3)^2} = \sqrt{9+16+9} = \sqrt{34}$$

$$CF = \sqrt{(0-3)^2 + (4-0)^2 + (0-3)^2} = \sqrt{9+16+9} = 7$$

31.

Number of straight lines formed
joining the 10 points, taking 2 at a time

$$= {}^{10}C_2$$

$$= \frac{10!}{2!8!} = 45$$

No of st lines formed by joining the
four points, taking 2 at a time

$$= {}^4C_2 = \frac{4!}{2!2!} = 6$$

$$= 120$$

MARKING SCHEME

Q. No.	ANSWER	Value Points
	But 4 collinear points, when joined pairwise given only one line.	
	Required no of st lines = $45 - 6 + 1$ $= 40$.	1
	OR.	
	Numbers greater than 50000 will have either 5 or 9 in the first place and will consist of 5 digit.	
	No of numbers of with digit at first place = $\frac{4!}{2!}$	1
	No of numbers with digit 9 at first place = $\frac{4!}{2!}$	1
	Hence the required numbers of numbers = $\frac{4!}{2!} + \frac{4!}{2!} = 24$.	1
	<u>Section - 2</u>	
32	$z = 1 - i$ $ z = \sqrt{1^2 + 1^2} = \sqrt{2}$ $\tan \theta = \frac{1 - i}{1}$ $= \frac{1 - i}{1}$	1
	$\Rightarrow \theta = +\pi/4$	1
	Since z lies on fourth quadrant then $\arg(z) = -\tan^{-1}(1)$ $= -\pi/4$	1
	polar form of $1 - i$ $= \sqrt{2} (\cos(-\pi/4) + i \sin(-\pi/4))$	2

MARKING SCHEME

ANSWER

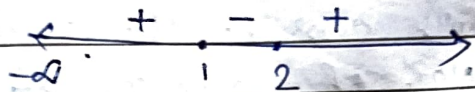
Q. No.

33. Solve: $\frac{|x-2|-1}{|x-2|-2} \leq 0$

let $y = |x-2|$ then

$$\frac{|x-2|-1}{|x-2|-2} \leq 0 \Rightarrow \frac{y-1}{y-2} \leq 0$$

$$\Rightarrow 1 \leq y < 2$$



$$\Rightarrow 1 \leq |x-2| < 2$$



$$\Rightarrow 1 \leq |x-2| \text{ and } |x-2| < 2$$

now, $1 \leq |x-2| \Rightarrow |x-2| \geq 1$

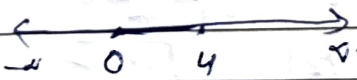
$$\Rightarrow x \leq 1 \text{ or } x \geq 3$$

$$\Rightarrow x \in (-\infty, 1] \cup [3, \infty)$$

and $|x-2| < 2$

$$\Rightarrow 2-2 < x < 2+2$$

$$\Rightarrow 0 < x < 4$$



Soln set of $|x-2| < 2$

Hence the soln set

of the given inequality is

$$((-\infty, 1] \cup [3, \infty)) \cap (0, 4) \\ = (0, 1] \cup [3, 4)$$

OR.

33.

Solve: $\frac{|x-1|}{x+2} < 1$

we have,

$$\frac{|x-1|}{x+2} < 1$$

$$\Rightarrow \frac{|x-1|}{x+2} - 1 < 0$$

Q. No.

$$\Rightarrow \frac{|x-1|}{x+2} - (x+1) < 0$$

Case-I when $x \geq -2$
 $\Rightarrow |x-1| = x-1$

$$\therefore \frac{x-1}{x+2} - (x+1) < 0$$

$$\Rightarrow \frac{(x-1) - (x+2)}{x+2} < 0$$

$$\Rightarrow \frac{-3}{x+2} < 0$$

$$\Rightarrow x+2 > 0$$

but $x \geq -2 \therefore x$

$$\Rightarrow x > -2$$

$\therefore$ Soln set

Case II when $x < -2$

$$|x-1| = -(x-1)$$

$$\therefore \frac{|x-1|}{x+2} - (x+1) < 0$$

$$\Rightarrow \frac{-(x-1)}{x+2} - (x+1) < 0$$

$$\Rightarrow \frac{2x+1}{x+2} < 0$$

$$\Rightarrow \frac{2x+1}{x+2} > 0$$

$$\Rightarrow x \in (-\infty, -2)$$

but $x < -2$

$$\therefore x \in (-\infty, -2)$$

and $x < -2 \Rightarrow x$

Soln $(-\infty, -2)$

Case I and Case

$$(-\infty, -2) \cup (0, 1] \cup [3, 4)$$

MARKING SCHEME

Q. No.	ANSWER	Value Points
	$\Rightarrow \frac{ x-1 - (x+2)}{x+2} < 0$	
	<u>Case-I</u> when $(x-1) \geq 0$ i.e. $x \geq 1$	
	$\Rightarrow x-1 = x-1$	
	$\therefore \frac{ x-1 - (x+2)}{x+2} < 0$	
	$\Rightarrow \frac{(x-1) - (x+2)}{x+2} < 0$	
	$\Rightarrow \frac{-3}{x+2} < 0$	
	$\Rightarrow x+2 > 0 \Rightarrow x > -2$	
	but $x \geq 1 \therefore x > -2$ and $x \geq 1$ $\Rightarrow x \geq 1$	2
	$\therefore$ Soln set $[1, \infty)$.	
	<u>Case II</u> when $x-1 < 0$ i.e. $x < 1$	
	$ x-1 = -(x-1)$	
	$\therefore \frac{ x-1 - (x+2)}{x+2} < 0$	
	$\Rightarrow \frac{-(x-1) - (x+2)}{x+2} < 0$	
	$\Rightarrow \frac{-2x-1}{x+2} < 0$	
	$\Rightarrow \frac{2x+1}{x+2} > 0$	
	$\Rightarrow x \in (-\infty, -2) \cup (-\frac{1}{2}, \infty)$	
	but $x < 1$ $\therefore x \in (-\infty, -2) \cup (-\frac{1}{2}, 1)$ and $x < 1 \Rightarrow x \in (-\infty, -2) \cup (-\frac{1}{2}, 1)$	2
	Soln $(-\infty, -2) \cup (-\frac{1}{2}, 1)$.	
	Case I and Case II $(-\infty, -2) \cup (-\frac{1}{2}, \infty)$	1

MARKING SCHEME

ANSWER

It given $T_3 = 84$, $T_4 = 280$, $T_5 = 560$

$$\text{e. have, } \frac{T_{r+1}}{T_r} = \frac{n_r \cdot n^{n-r} \cdot a^n}{n_{r+1} \cdot n^{n-r+1} \cdot a^{n-1}}$$

$$= \frac{n-r+1}{n} \cdot \frac{a}{n}$$

$$\frac{T_4}{T_3} = \frac{n-2}{3} \cdot \frac{a}{n} \quad \text{and} \quad \frac{T_5}{T_4} = \frac{n-3}{4} \cdot \frac{a}{n}$$

$$\Rightarrow \frac{280}{84} = \frac{n-2}{3} \cdot \frac{a}{n} \quad \text{and} \quad \frac{560}{280} = \frac{n-3}{4} \cdot \frac{a}{n}$$

$$\Rightarrow \frac{10}{3} = \frac{n-2}{3} \times \frac{a}{n} \quad \text{and} \quad 2 = \frac{n-3}{4} \times \frac{a}{n}$$

$$\Rightarrow \frac{a}{n} = \frac{10}{n-2} \quad \text{and} \quad \frac{a}{n} = \frac{8}{n-3}$$

$$\Rightarrow \frac{10}{n-2} = \frac{8}{n-3}$$

$$\Rightarrow 5n-15 = 48-8 \Rightarrow n=7$$

$$\text{putting } n=7 \text{ in } \frac{a}{n} = \frac{10}{n-2}$$

$$2n = a$$

$$\text{now, } T_3 = 84$$

$$n_2 \cdot r^{n-2} \cdot a^2 = 84$$

$$\Rightarrow \frac{7}{2} \cdot r^5 (2r)^2 = 84$$

$$\Rightarrow 21 \times 2^4 \times r^7 = 84$$

$$\Rightarrow r^7 = 1$$

$$\Rightarrow r = 1$$

$$\therefore a = 2n = 2 \times 1 = 2$$

$$n=7, a=2, r=1$$

MARKING SCHEME

Q No.

ANSWER

Value Points

OR

We have,

$$a_{r-1} = \text{coefficient of } x^{r-1} \text{ in } (1-x)^{2n-1}$$

$$= (-1)^{r-1} \cdot {}^{2n-1}C_{r-1}$$

1

$$a_{2n-r} = \text{coefficient of } x^{2n-r} \text{ in } (1-x)^{2n-1}$$

$$= (-1)^{2n-r} \cdot {}^{2n-1}C_{2n-r}$$

1

$$\therefore a_{r-1} + a_{2n-r}$$

$$= (-1)^{r-1} \cdot {}^{2n-1}C_{r-1} + (-1)^{2n-r} \cdot {}^{2n-1}C_{2n-r}$$

$$= (-1)^{r-1} \cdot {}^{2n-1}C_{r-1} + (-1)^{2n-r} \cdot (-1)^{-r} \cdot {}^{2n-1}C_{r-1}$$

$$\left[\because {}^nC_r = {}^nC_{n-r} \right]$$

$$= (-1)^{r-1} \cdot {}^{2n-1}C_{r-1} + (-1)^{-r} \cdot {}^{2n-1}C_{r-1}$$

1

$$= \left\{ (-1)^{r-1} + (-1)^{-r} \right\} \cdot {}^{2n-1}C_{r-1}$$

$$= \left\{ (-1)^{r-1} + \frac{1}{(-1)^r} \right\} \cdot {}^{2n-1}C_{r-1}$$

$$= \left\{ \frac{(-1)^{2r-1} + 1}{(-1)^r} \right\} \cdot {}^{2n-1}C_{r-1}$$

$$= \left\{ \frac{-1 + 1}{(-1)^r} \right\} \cdot {}^{2n-1}C_{r-1} = 0 \quad \left[\because (-1)^{\text{odd}} = -1 \right] \cdot 2$$

MARKING SCHEME

Q. No.

ANSWER

35.

class.	Mid value (m_i)	f_i	Cf	$ m_i - 14 $	$f_i m_i - 14 $
0-6	3	8	8	11	88
6-12	9	10	18	5	50
12-18	15	12	30	1	12
18-24	21	9	39	7	63
24-30	27	5	44	13	65

$$\sum f_i = N = 44$$

$$\sum f_i |m_i - 14| = 278$$

$$N = 44$$

$$\text{So, } \frac{N}{2} = 22$$

12-18 is the median class.

$$\text{Median} = l + \frac{\frac{N}{2} - F}{f} \times h$$

$$= 12 + \frac{22 - 18}{12} \times 6$$

$$= 12 + \frac{4 \times 6}{12}$$

$$= 14$$

Clearly $\sum f_i |m_i - 14| = 278$.

$$\text{Mean deviation about median} = \frac{1}{N} \sum f_i |m_i - 14|$$

$$= \frac{278}{44}$$

$$= 6.318 \text{ Ans.}$$

MARKING SCHEME

Q. No.	ANSWER	Value Points
36	Here $a_3 = 600$, $a_7 = 700$	
a)	$\begin{aligned} a + 2d &= 600 \\ - a + 5d &= 700 \end{aligned}$	$\frac{1}{2}$
	$d = \frac{100}{3} = 25$	$\frac{1}{2}$
b)	$a = 600 - 50 = 550$ = Production in 1st yr	1
c)	Production in 10 years,	
	$S_{10} = \frac{10}{2} [2a + 9d]$ $= 5 [2 \times 550 + 9 \times 25]$ $= 5 [1100 + 225] = 5 \times 1325 = 6625$ 	$\frac{1}{2}$
	$= 5 [5 \times 550 + 9 \times 25]$	$\frac{1}{2}$
	$= 5 (2750 + 225) = 5 \times 2975$	$\frac{1}{2}$
	$= 14875$	$\frac{1}{2}$
	OR	
	Number of computer produced in 21st year	
	$a_{21} = a + (21-1)d$	$\frac{1}{2}$
	$= 550 + 20 \times 25$	$\frac{1}{2}$
	$= 550 + 500$	$\frac{1}{2}$
	$= 1050$	$\frac{1}{2}$
37	The equation of the path $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	
a)	$2a = 10 \Rightarrow a = 5$ $2c = 8 \Rightarrow c = 4$	1
b)	$c^2 = a^2 - b^2$ $b^2 = a^2 - c^2 = 25 - 16 = 9$ $b = 3$	$\frac{1}{2}$
c)	The equation is $\frac{x^2}{25} + \frac{y^2}{9} = 1$	2
e)	OR	
	$2a + b = 2 \times 5 + 3 = 13$	2

MARKING SCHEME

Q. No.

ANSWER

587 Let $M \rightarrow$ Mathematics, $E \rightarrow$ Economics,
 $P \rightarrow$ Physical education.

$$n(M) = 80, n(E) = 120, n(P) = 90$$

$$n(M \cap P) = 50, n(E \cap P) = 60, n(M \cap E) = 40$$

$$n(M \cap E \cap P) = 20$$

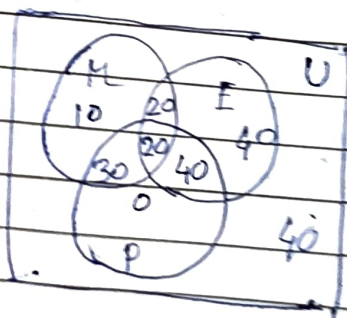
Required number of students taking exactly one subject is

$$n(M) + n(P) + n(E) - 2n(M \cap P) - 2n(P \cap E) - 2n(E \cap M) + 3n(M \cap P \cap E)$$

$$= 80 + 120 + 90 - (2 \times 50) - (2 \times 60) - (2 \times 40) + 3 \times 20$$

$$= 290 - 100 - 120 - 80 + 60$$

$$= 50$$



or At least one subject = $10 + 40 + 20 + 40 + 30 + 20$
 $= 160$

BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN
ANNUAL EXAMINATION: (2025-2026)
MATHEMATICS
CLASS: XI

Time : 3 Hours**Maximum Marks : 80****NAME: _____ SEC.: _____ ROLL NO: _____****General Instructions :**

1. The Question paper contains 38 questions. All questions are compulsory.
2. The question paper is divided into five sections-A, B, C, D and E.
3. In Section A, Question no. 1 to 18 are multiple choice questions (MCQs) with only one correct option and Question no. 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In Section B, Question no. 21 to 25 are Very Short Answer (VSA)- type questions, carrying 02 marks each.
5. In Section C, Question no. 26 to 31 are Short Answer (SA)- type questions, carrying 03 marks each.
6. In Section D, Question no. 32 to 35 are Long Answer (LA)- type questions, carrying 05 marks each.
7. In Section E, Question no. 36 to 38 are case study-based questions, carrying 04 marks each.
7. All Questions are compulsory. However, an internal choice has been provided in 2 questions in section B, 3 questions in Section C and 2 questions in Section D and one subpart each in 2 questions of Section E.
8. Use of calculator is not allowed.

SECTION-A

This section comprises of MCQs of 1 mark each. Select the correct option (Question 1-Question 18).

1. Which of the following is correct? 1
 (A) $\sin 1^\circ > \sin 1$ (B) $\sin 1^\circ < \sin 1$ (C) $\sin 1^\circ = \sin 1$ (D) $\sin 1^\circ > \frac{\pi}{180} \sin 1$
2. If $x, y \in R$, then $x + iy$ is a non-real complex number if 1
 (A) $x = 0$ (B) $y = 0$ (C) $x \neq 0$ (D) $y \neq 0$
3. The value of $(1 + i)^4 + (1 - i)^4$ is 1
 (A) 8 (B) 4 (C) -8 (D) -4
4. The solution set of $\frac{3}{x-2} < 1, x \in R$ is 1
 (A) $(-\infty, 2)$ (B) $(5, \infty)$ (C) $(2, 5)$ (D) $(-\infty, 2) \cup (5, \infty)$
5. The solution set of the inequality $|x + 2| \leq 5$ is 1
 (A) $(-7, 5)$ (B) $[-7, 3]$ (C) $[-5, 5]$ (D) $(-7, 3)$
6. The number of different four-digit numbers that can be formed using the digits 1, 3, 4, 7 (each used exactly once) is 1
 (A) 120 (B) 96 (C) 24 (D) 100
7. If $C(n, 12) = C(n, 8)$, then $C(22, n)$ is equal to 1
 (A) 231 (B) 210 (C) 252 (D) 303
8. The constant term in the expansion of $\left(x - \frac{1}{x}\right)^{10}$ is 1
 (A) 152 (B) -152 (C) -252 (D) 252
9. The coefficient of x^4 in $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$ is 1
 (A) $\frac{405}{256}$ (B) $\frac{504}{259}$ (C) $\frac{450}{263}$ (D) $\frac{504}{263}$
10. The value of $9^{\frac{1}{3}} \cdot 9^{\frac{1}{9}} \cdot 9^{\frac{1}{27}} \dots$ to ∞ is 1
 (A) 1 (B) 3 (C) 9 (D) 27
11. The third term of a G.P. is 4. The product of its first five terms is 1
 (A) 4^3 (B) 4^5 (C) 4^4 (D) 4^0
12. The reflection of the point $(4, -13)$ about the line $5x + y + 6 = 0$ 1
 (A) $(-1, -14)$ (B) $(3, 4)$ (C) $(0, 0)$ (D) $(1, 2)$
13. The area of the circle centred at $C(4, 2)$ and passing through $P(4, 6)$ is 1
 (A) 5π (B) 10π (C) 36π (D) 45π

14. If the focus of a parabola is at $(0, -3)$ and its directrix is $y = 3$, then its equation is 1
 (A) $y^2 = -12x$ (B) $x^2 = 12y$ (C) $y^2 = 12x$ (D) $x^2 = -12y$
15. Length of the major axis of the ellipse $9x^2 + 7y^2 = 63$ is 1
 (A) 3 (B) 9 (C) 6 (D) $2\sqrt{7}$
16. Equation of the hyperbola with eccentricity $\frac{3}{2}$ and foci at $(\pm 2, 0)$ is 1
 (A) $\frac{x^2}{4} - \frac{y^2}{5} = \frac{4}{9}$ (B) $\frac{x^2}{9} - \frac{y^2}{9} = \frac{4}{9}$ (C) $\frac{x^2}{4} - \frac{y^2}{9} = 1$ (D) $\frac{y^2}{9} - \frac{x^2}{4} = 1$
17. x-axis is the section of two planes 1
 (A) xy and xz (B) yz and zx (C) xy and yz (D) xz and zy
18. $\lim_{x \rightarrow 0} \frac{x}{\tan x}$ is 1
 (A) 0 (B) 1 (C) 4 (D) not defined.

Assertion –Reason Based Questions

- a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.
 b) Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion.
 c) Assertion is true but the Reason is false.
 d) Reason is true but the Assertion is false.
19. **Assertion(A):** Mean of 201, 202, ..., 300 is 5250 1
Reason(R): The mean of first n natural numbers is $\frac{n+1}{2}$.
20. **Assertion(A):** If A, B, C are three mutually exclusive and exhaustive events of an experiment such that $P(A) = 2P(B) = 3P(C)$, then $P(A) = \frac{6}{11}$ 1
Reason(R): If A, B, C are mutually exclusive and exhaustive events of an experiment, then $P(A) + P(B) + P(C) = 1$

SECTION-B

This section comprises of 5 very short answer type questions of 2 marks each.

21. Evaluate $\sin 75^\circ$ and $\tan 135^\circ$ 2
22. (A) Find the 4th term from the end of the following expression : $\left(\frac{x^3}{2} - \frac{2}{x^2}\right)^9$ 2
OR
 (B) Expand $\left(x^3 - \frac{2}{x^2}\right)^6$
23. Check whether $(3, -2, 4)$, $(1, 1, 1)$ and $(-1, 4, -2)$ are collinear or not. 2
24. (A) Evaluate : $\lim_{x \rightarrow 1} \frac{(2x-3)(\sqrt{x}-1)}{2x^2+x-3}$ 2
OR
 (B) Evaluate : $\lim_{x \rightarrow 0} \frac{(1+x)^6 - 1}{(1+x)^5 - 1}$
25. Find the variance of the data 15, 17, 10, 13, 7, 18, 9, 6, 14, 11. 2

SECTION-C

This section comprises of 6 short answer type questions of 3 marks each.

26. Prove that $\tan 56^\circ = \frac{\cos 11^\circ + \sin 11^\circ}{\cos 11^\circ - \sin 11^\circ}$ 3
27. If f is a real function satisfying $f\left(x + \frac{1}{x}\right) = x^2 + \frac{1}{x^2} \quad \forall x \in \mathbb{R} - \{0\}$, then write the expression for $f(x)$. 3
28. (A) If $\left|\frac{z-5i}{z+5i}\right| = 1$, show that z is a real number. 3
OR
 (B) Separate $\left(\frac{3+\sqrt{-1}}{2-\sqrt{-1}}\right)$ into real and imaginary parts and hence find its modulus.
29. (A) Find all pairs of consecutive odd positive integers, both smaller than 10, such that their sum is more than 11. 3
OR
 (B) Solve the inequation : $\frac{|x+3|+x}{x+2} > 1, x \in \mathbb{R}$
30. In a G.P., it is given that $T_1 = 3, T_n = 96$ and $s_n = 189$. Find the value of n . 3
31. (A) A card is drawn at random from a well-shuffled deck of 52 cards. Find the probability that it is a spade or a king. 3

OR

(B) Two dice are tossed together. Find the probability of getting a doublet or a total of 6.

SECTION-D

This section comprises of 4 long answer type questions of 5 marks each.

32. (A)(i) If $\sin\theta = -\frac{4}{5}$ and $\pi < \theta < \frac{3\pi}{2}$, find the values of all other five trigonometric functions. 3+2
(ii) If $3\tan A \tan B = 1$ then prove that $2\cos(A+B) = \cos(A-B)$

OR

33. (B) Evaluate : $\sin 18^\circ$ 3+2
Find the domain and range of the function
(i) $f(x) = \frac{x}{1+x^2}$
(ii) $f(x) = \frac{1}{2-\sin 3x}$

34. (A) If $y = \left\{ \frac{1-\tan x}{1+\tan x} \right\}$, show that $\frac{dy}{dx} = \frac{-2}{1+\sin 2x}$ 5

OR

(B) Find the derivative of $\sin^2 x$ from first principles.

35. Find the mean deviation about the mean and mean deviation about median for the following data: 5

x_i	3	5	7	9	11	13
f_i	6	8	15	25	8	4

SECTION- E

This section comprises of 3 case study / Passage-based questions of 4 marks each with subparts. The first two case study have three subparts (i),(ii),(iii) of marks 1,1,2 respectively. The third case study question has two subparts of 2 marks each.

36. **Case Study-1**

The sum of the cardinal numbers of two finite sets A and B is equal to the ratio of the cardinal numbers of the power set of A to that of B. Based on the above information, answer the following:

- (i) Find the cardinal number of set A. 1
(ii) Find the cardinal number of set B. 1
(iii) (A) Find the maximum value of $n(A \cap B)$. 2

OR

(B) Find the minimum value of $n(A \cup B)$.

37. **Case Study-2**

Five couples were invited to a tea party. They were asked to sit on one side of a long table.

Based on the above information, answer the following:

- (i) Find the number of ways in which five couples can be seated. 1
(ii) Find the number of ways in which all males sit together and all females sit together. 1
(iii) (A) Find the number of ways in which no two females sit together. 2

OR

(B) Find the number of ways in which all females never sit together.

38. **Case Study-3**

A ray of light is thrown from the point (3, 2) parallel to the line $4x-3y+6=0$, On reaching the x-axis, the ray is reflected. Based on the above information, answer the following:

- (i) Find the equation of the line containing the ray of light. 2
(ii) Find the coordinates of the point where the ray of light strikes the x-axis. 2

BURNPUR RIVERSIDE SCHOOL, CHITTARANJAN
ANNUAL EXAMINATION: (2025-2026)
PHYSICAL EDUCATION
CLASS: XI

Time: 3 Hours**Maximum Marks: 70****NAME: _____ SEC.: ____ ROLL NO.: ____****GENERAL INSTRUCTIONS**

- 1) The question paper consists of 5 sections and 37 Questions.
- 2) Section A consists of questions **1-18** carrying **1 mark** each and is multiple choice questions. All questions are compulsory.
- 3) Section B consists of questions **19-24** carrying **2 marks** each and are very short answer types and should not exceed 60-90 words. **Attempt any 5.**
- 4) Section C consists of questions **25-30** carrying **3 marks** each and are short answer types and should not exceed 100-150 words. **Attempt any 5.**
- 5) Section D consists of questions **31-33** carrying **4 marks** each and are case studies.
- 6) Section E consists of questions **34-37** carrying **5 marks** each and are long answer types and should not exceed 200-300 words. **Attempt any 3.**

(SECTION - A)**(All questions are compulsory)**

1. What is the primary goal of physical education? 1
 a) Improve professional relationships b) Improve academic scores
 c) Decrease Productivity d) Increase Productivity
2. When was the Central Advisory Board of Physical Education established? 1
 a) 1947 b) 1948 c) 1950 d) 1956
3. The Olympic flag was first hosted in _____. 1
 a) 1922 b) 1920 c) 1930 d) 1932
4. Match the following. 1

List - I (olympic games venues)	List – II (year)
i) Antwerp olympic.	1)2000
ii) sydney.	2)2012
iii) London.	3)1896
iv) Athens.	4)1920

- (a) i - 4, ii - 1, iii - 3, iv - 2
 (c) i - 1, ii - 2, iii - 3, iv - 4

- (b) i - 2, ii - 4, iii - 1, iv - 3
 (d) i - 4, ii - 1, iii - 2, iv - 3

5. There are eight stages of training for a yogi to go through in order to reach moksha (release), what is the final stage called? 1
 a) Samadhi b)Yama c) Pranayama d) Kaivalya

6. Which of the following is a Kriya? 1
a) Nadishodhana b) Kapalbhathi c) Ujjayi d) Bhastrika
7. Disability etiquettes are related to 1
a) Ignorance b) No relation disabled
c) Always keep interfering d) Assistance as needed
8. When was the Word 'First Aid' first used? 1
a) 1869 b) 1905 c) 1890 d) 1879
9. Skinfold technique is used to measure 1
a) weight b) fat percentage c) birth measurement d) over fatness
10. The Principal organ of respiration is 1
a) Nose b) Larynx c) Trachea d) Lungs
11. When the angle between the two bones decreases, it is termed as _____. 1
a) Flexion b) Extension c) Abduction d) Adduction
12. Infancy stage is for the group 1
a) 11-20 years b) 6-11 years c) 1-6 years d) 0-2 years
13. Which one of the following is NOT a problem related to adolescence. 1
a) Eating disorder b) Substance abuse
c) Anti-social behaviour d) Lack of language development
14. Given below are the two statements labelled as 1
Assertion (A) and Reason (R)
Assertion (A): Adolescence is a stage of rapid development.
Reason (R): In this stage, change happens in the physical, mental, emotional and social spheres of young people. In the context of above two statements, which one of the following is correct?
a) Both (A) and (R) are true and (R) is the correct explanation of (A)
b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
c) (A) is true but (R) is false.
d) (A) is false but (R) is true.
15. -----defined "sports training is an educational process based on scientific 1
principles that aims to prepare players for a higher level of performance in sports competition".
a) Martin b) Hardayal Singh c) Matwejew d) Grosser
16. In sports training limbering down is done: 1
a) Before Competition b) During Competition c) After Competition d) Never
17. Micro - Cycle involves training of 1
a) 3-10 days b) 3-6 weeks c) 10-12 weeks d) 4-12 months.
18. Exercising for a longer duration with less weight is related to: 1
a) Co-ordination b) Speed c) Strength d) Endurance

(SECTION - B)
(Attempt any 5 questions)

19. Describe the Olympic flag. 2
20. Give the benefits of Kapalbhathi. 2

21. What is intellectual disability? 2
22. What do you understand by Ball and Socket joint ? 2
23. What do you understand by Psychology and Sports Psychology ? 2
24. What are the causes of overload? 2

(SECTION - C)
(Attempt any 5 questions)

25. Explain in detail career option of physical education. 3
26. Describe any three co-ordination ability. 3
27. Explain the types of somato body types. 3
28. Describe the functions of muscles. 3
29. Why is Team cohesion useful in sports? 3
30. Describe the importance of warming - up in Sports. 3

(SECTION - D)

31. Honourable Prime Minister launched Fit India Movement to make fitness an integral part of our daily life. The aim of this committee is to make sports a part of the life for all Indians by bringing a behavioral change in their way of living.



[1X4=4]

Look at the image carefully.

- i). Fit India movement was launched on.....
- a) 15th August 2020. b) 29th August 2019.
c) 1st January 2019. d) 5th September 2020.
- ii).is the chairman of Fit India Movement.
- a) Kiren Rijju b) Amit Shah c) Narendra Modi d) Rajnath Singh
- iii) The movement is the ministerial effort.
- a) Solo b) Regional c) Limited d) Multi
- iv) This program is also used to promote.....in a big way.
- a) Fitness b) Sports c) Yoga d) Nutrition

32. On the basis of the given picture answer the following questions.

[1X4=4]

- i) The name of the test shown in the picture is -
- a) Rock port test b) Barrow fitness test
c) Harvard step test d) Kraws weber test



- ii) In which year was this test developed?

a) 1923 b) 1933 c) 1943 d) 1953

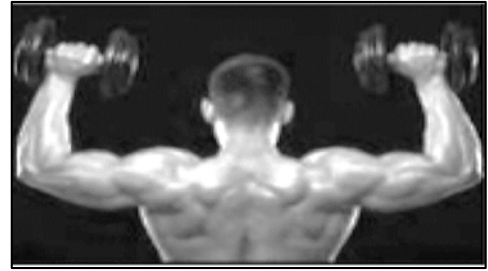
- iii) This test was developed by -

a) Coubartin b) Bronha c) Sheldon d) James

- iv) The height of the bench in this test for women is -

a) 16 inches b) 20 inches c) 25 inches d) 30 inches

33. Satbir, wants to develop his physical fitness, he asked his trainer about it, and his trainer [1×4=4] tells him the component of physical fitness. Identify the component of physical fitness.



- i). Is the component shown in the above picture.
- a) Muscular strength b) Flexibility
c) Muscular endurance d) Aerobic capacity
- ii) It is the amount of force muscles can exert against..... For a short duration, in anaerobic activity.
- a) Weight b) Distance c) Speed d) Resistance
- iii) Muscular strength is the ability of the cells to supply muscle energy in the form of.....To muscle fibres.
- a) Glucose b) Creatin c) Adenosine triphosphate d) Oxygen
- iv) Resistance includes external objects, or even own-----during body weight exercise.
- a) Strength b) weight c) Power d) Flexibility

(SECTION - E)
(Attempt any 3 questions)

- | | | |
|-----|---|---|
| 34. | Explain Ancient and Modern Olympic in detail. | 5 |
| 35. | Explain Principles of Sports Training. | 5 |
| 36. | Write the various stages of development and describe the characteristics of any two stages. | 5 |
| 37. | Explain the aim and objective of Adaptive Physical Education. | 5 |