

Test No.	43-21
Section	ELA
Year	2014

Roll No.	1234567890
Batch Number	Q34567890
220741	

**SCHOLASTIC APTITUDE TEST**

(For Students of Class XI)

Time: 90 Minutes Max. Marks: 100

**INSTRUCTIONS AND NOTES**

Read the following instructions carefully before

**Starting the Test**

1. Open the test booklet. Do not open the OMR sheet.

2. There are 100 questions in the test. All are multiple choice questions. The first 50 questions relate to English, Science, Social Studies, etc. The last 50 questions relate to Mathematics, etc. 40 to 45 marks are given for Mathematics and 50 to 55 marks for Science subjects.

3. Please follow the instructions given on the OMR sheet to mark your answers.

4. Write your eight digit Roll Number allotted to you in the admission card clearly on the test booklet, followed by your name, on the OMR sheet in the spaces given.

5. Write your roll number, test booklet number in the appropriate boxes on the OMR sheet as per instructions given.

6. Since the time allowed for this paper is 90 minutes and there are 100 questions, you must estimate the time required for answering each question.

7. Length marks are also provided on the test booklet issued on the OMR sheet.

8. Last question will be worth 10 marks.

**OMR SHEET: WRITE IN BLACK INK - NEGATIVE MARKING**

9. Please indicate only one OMR sheet in the invigilating officer's list.

10. Every question on the question paper will be numbered. In case of any discrepancy, please report it to the invigilator.

11. Please turn over the page to start answering immediately after you are asked to do so.

12. **DO NOT USE PENCIL OR ERASER ON THE OMR SHEET.**13. The original or photocopy of this booklet will be sent to the NCTB and is published to enable students to refer to it during group work permission of the NCTB. The answer key will be available to all concerned students on the project website [www.nctb.org](http://www.nctb.org).

14. 22, 554, 186, 181.

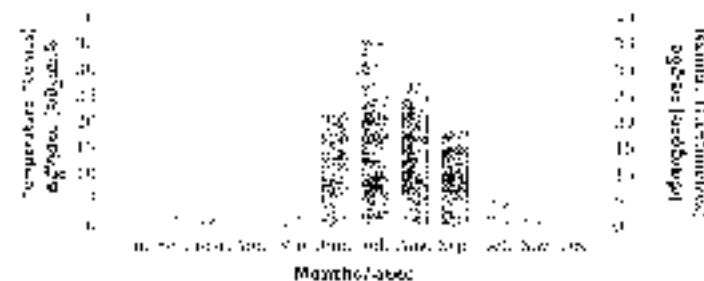
Page No. \_\_\_\_\_

1. A set of quadrilaterals made out of cards is given below. Parallelogram exists in both the sets of shapes. This is reflected in
- Definite parallelogram
  - Sufficiently large parallelogram
  - Definite parallelogram with diagonals
  - Definite parallelogram with only one diagonal
2. A country has 100000 villages and 10000 towns. The area of internal and external units of administration is represented by the output parameter. Its value is related to its relation with other units. Which centre is reflected in these measures?
- Republic
  - State level
  - Nationality
  - Municipal
3. Ambedkar Jayanti is an important festival of Indian polity system. It is held annually to commemorate the birth anniversary of a number of social reformers with respect to the detection of which of the following?
- President
  - Prime Minister
  - First Indian Supreme Court puisne Judge
  - Speaker of the Lok Sabha or the Chairman of the Rajya Sabha
4. Which of the following cannot be called an independent judiciary in India?
- Judiciary is not under the control of executive and legislature
  - Supreme Court respects the independence of the judiciary by the manner of discharging its judicial functions
  - A judge in either the lower or higher court of the country can be removed by the executive or the legislature through impeachment which requires 2/3 majority of the members of both the houses of parliament
  - Chief Justice of India
- Article II
  - Article III
  - Article IV
  - Article V
5. Which of the following land areas does India have in common with Russia?
- Punjab
  - Rajasthan
  - Uttar Pradesh
  - Odisha
6. Which method of election was adopted to nominate the members of the Lok Sabha from Bihar?
- Proportional representation by single transferable vote
  - Majoritarian
  - Majority representation
  - Majority representation by single transferable vote
7. In the context of Indian polity, which of the following is true?
- Executive, legislative and judicial are interdependent
  - Executive, legislative and judiciary are interdependent
  - Executive, legislative and judiciary are interdependent and interrelated
  - Executive's independence is only during the term of the Lok Sabha and the Lok Sabha depends on executive. Executive is not dependent on Lok Sabha
  - Executive, legislative and judiciary are interdependent and interrelated
- Executive
  - Legislative
  - Executive and Legislative
  - Executive, Legislative and Judicial





6. The following graph shows the distribution of mean monthly temperature in four cities. Which of the following is true?



In the construction of the bar chart, which of the following is true?

- Which one of the following choices views the elements of a class described in the foregoing?

- Snapshot
- Behavior
- Implementation
- Generalization

7. The average monthly temperatures of four stations are given in the following table. The temperatures in degrees Celsius are the measurements of a day each year.

Station	Average Mean Yearly Temperature (degrees Celsius)											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	SEPT	OCT	NOV	DEC	
A	-11.1	-6.5	2.3	10.0	16.0	21.0	24.0	21.0	16.0	10.0	5.0	
B	-10.5	-6.2	2.1	9.8	15.5	20.6	23.5	20.5	15.5	9.8	5.2	
C	-9.5	-5.9	1.7	9.6	14.4	19.6	22.3	19.6	14.4	9.6	5.9	
D	-8.5	-5.6	1.3	9.3	13.9	18.6	21.0	18.6	13.9	9.3	5.6	

Which one of these stations experiences seasonal modulating influence in its climate, as seen in?

- A
- B
- C
- D

8. A certain District has a total area of 2000 km<sup>2</sup>. It has 1000000 people living in it. The population density is 500 persons/km<sup>2</sup>.

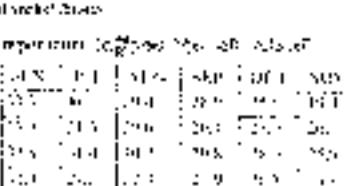


In the construction of the bar chart, which of the following is true?

- g. Standard deviation is dependent on two variables: range and variance.

- Range
- Variance
- Median
- Standard deviation

9. A set of 100 data points has a standard deviation of 4.0. If the average value of the set is 10.0, then the range of the data set is approximately



g. Range = 2 \* Standard Deviation

- A
- B
- C
- D

10. Observations give the following results:

City	Female Literacy Rate (%)	Male Literacy Rate (%)	
		Sex Ratio	Sex Ratio
A	88.77	51.38	90.0
B	77.16	62.67	92.0
C	71.38	52.17	93.9
D	68.56	51.21	97.2

Based on the above table, identify the city which has the extent of equality between male and female literacy level is best in terms of the given parameters?

- A
- B
- C
- D

11. Shanti observes significant change in elevation by climbing 1000 m and animal vegetation was dominated by cold climate pine woods and alpine shrubs.

Identify the proper sequence of vegetation type she has observed from the following:

- Alpine to Temperate to Subtropical
- Subtropical to Temperate to Alpine
- Subtropical to Alpine to Temperate
- Temperate to Alpine to Subtropical

12. The following table gives the details of the various species of birds observed in a park.

Species	No. of Birds	Age Group	Gender	Percentage
Swallow	160	Young	Male	50.0
Swallow	160	Young	Female	50.0
Spurred	120	Young	Male	40.0
Spurred	120	Young	Female	60.0
Spurred	120	Adult	Male	40.0
Spurred	120	Adult	Female	60.0
Blue Rock Pigeon	100	Young	Male	33.3
Blue Rock Pigeon	100	Young	Female	66.7
Blue Rock Pigeon	100	Adult	Male	33.3
Blue Rock Pigeon	100	Adult	Female	66.7

g. Life span, before, parent, female & male ratio and sex ratios & age groupings are required.

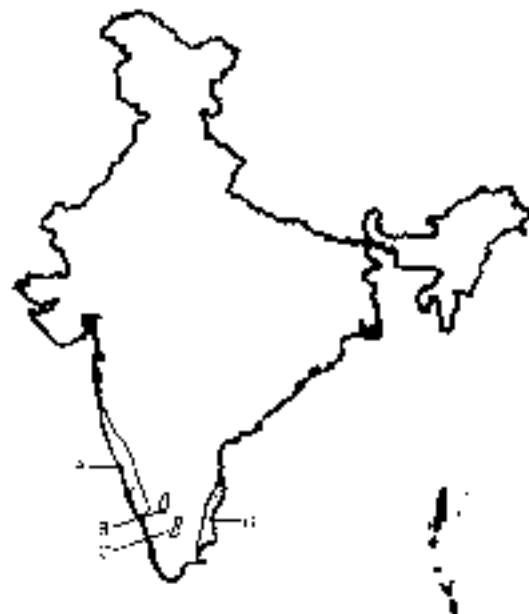
- A
- B
- C
- D

13. A cold, wet, mountainous region with high altitude and low temperatures has a large number of coniferous trees, and the soil is very poor and acidic.

Identify the correct combination of plants found in such regions.

- Evergreen and subtropical evergreen
- Temperate, moist and warm evergreen
- Evergreen, moist, cool, wet, and warm
- Evergreen, cool, moist, and acidic

20. Observe the map given below.



Identify the shaded regions with their corresponding geographical features and select the correct option using the code given below.

1. A - Zone of Marine soil, B - Coffee producing area, C - Cotton textile industries, D - Evergreen forests, river
2. A - Evergreen forest zone, B - Coffee producing area, C - Zone of Laterite soil, D - Cotton textile industries
3. A - Evergreen forest cover, B - Zone of living soil, C - Coal producing area, D - Cotton textile industries
4. A - Cotton textile industries, B - Coffee producing area, C - Zone of Marine soil, D - Evergreen forests

21. Orissa can be called

21. Which of the following mountain ranges receives maximum rainfall during monsoon season?

1. Himalaya, 2. Aravalli, 3. Vindhya, 4. Western Ghats, 5. Shivalik, 6. Deccan Plateau, 7. Eastern Ghats, 8. Nilgiri, 9. Sahyadri
2. Deccan Plateau, 3. Barren land of Satara, 4. Plateau of Hukka, 5. Malnad of Aravalli, 6. mountain of Aravalli, 7. Great Indian Peninsula, 8. Nilgiri, 9. Sahyadri, 10. Vindhya

22. The given map shows number of different mineral peaks in India.

21. The following statement describes the  
geographical feature of the state of  
Karnataka. Which one of the following  
is correct?

1. It has a large area of coastal plain.
2. It has a large area of hilly terrain.
3. It has a large area of plains.
4. It has a large area of plateaus.
5. It has a large area of deserts.

22. Karnataka is placed in which of the following groups?

23. Below regions were known and used  
since ancient northern region of the country:  
except which region?

1. A - Meghalaya, B - tribal culture pattern, C - iron & copper deposits, D - coal deposits
2. A - iron ore belt, B - mica, C - Meghalaya, D - coal deposits
3. A - iron ore belt, B - mica, C - Meghalaya, D - coal deposits
4. A - iron ore belt, B - mica, C - coal deposits, D - tribal culture pattern
5. A - iron ore belt, B - mica, C - coal deposits, D - tribal culture pattern

Minerals are found in various parts of India.  
Let us see by studying the North to South  
map by the help of questions of group  
C and D will follow.

1. A - Manganese, B - Andhra, C - Bihar, D - Maharashtra
2. A - Bihar, B - Maharashtra, C - Meghalaya, D - Andhra
3. A - manganese, B - Bihar, C - Bihar, D - Maharashtra
4. A - manganese, B - Maharashtra, C - Bihar, D - Andhra
5. A - manganese, B - Bihar, C - Bihar, D - Maharashtra

23. Iron, copper and other non-ferrous  
metals are also called  
minerals. Name two other  
minerals which are  
non-ferrous metals.

1. A - coal, B - iron
2. A - iron, B - manganese
3. A - iron, B - manganese
4. A - manganese, B - iron
5. A - manganese, B - coal
6. A - manganese, B - coal
7. A - manganese, B - iron
8. A - manganese, B - coal
9. A - manganese, B - iron
10. A - manganese, B - coal

21. Which one of the following statements is true about the following statement made by a historian given below?  
 A) The Shang Dynasty (c. 1600-1046 BC) was a highly centralized monarchy in all its structures and had a strong central government to keep the period of its reign peaceful.  
 B) Which one of the following steps was taken by the Shang?  
 1. Feud  
 2. Jizi  
 3. Shishi  
 4. Supremacy
22. The following statement is true for which of the following periods in Indian history?  
 A) Mauryan, Chola, and Chera  
 B) Mauryan, Chola, and Chera  
 C) Mauryan, Chola, and Chera  
 D) Mauryan, Chola, and Chera
23. River Indus civilization, Indus-Saraswati civilization, and Indus-Kushana civilization are three major civilizations in the Indus Valley. Among these, the river Indus is known as the  
 A) Indus River, Indus-Sind  
 B) Indus River, Indus-Sind  
 C) Indus River, Indus-Sind  
 D) Indus River, Indus-Sind
24. Which one of the following statements is true about the Indus Valley Civilization?  
 A) Indus Valley people were  
 1. Good agriculturists  
 2. Good weavers  
 3. Good potters  
 4. Good metal workers
25. Every year, the specific site of the Indus Valley Civilization is declared as the  
 A) Archaeological site of the year  
 B) Archaeological site of the year  
 C) Archaeological site of the year  
 D) Archaeological site of the year
26. Which one of the following statements is true about the Indus Valley Civilization?  
 A) Indus Valley people were  
 1. Good agriculturists  
 2. Good weavers  
 3. Good potters  
 4. Good metal workers

27. Consider the following statement made by a historian given below:  
 The Shang Dynasty (c. 1600-1046 BC) was a highly centralized monarchy in all its structures and had a strong central government to keep the period of its reign peaceful.

- 1. Good
- 2. Bad
- 3. Ok
- 4. Good

28. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Indus Valley people were  
 1. Good agriculturists  
 2. Good weavers  
 3. Good potters  
 4. Good metal workers

29. Every year, the specific site of the Indus Valley Civilization is declared as the  
 A) Archaeological site of the year  
 B) Archaeological site of the year  
 C) Archaeological site of the year  
 D) Archaeological site of the year

- 1. Indus Valley people were  
 1. Good agriculturists  
 2. Good weavers  
 3. Good potters  
 4. Good metal workers

30. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Indus Valley people were  
 1. Good agriculturists  
 2. Good weavers  
 3. Good potters  
 4. Good metal workers

31. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Good
- 2. Bad
- 3. Ok
- 4. Good

32. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Good



33. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Good
- 2. Bad
- 3. Ok
- 4. Good



34. Which one of the following statements is true about the Indus Valley Civilization?  
 A) Indus Valley people were  
 1. Good agriculturists  
 2. Good weavers  
 3. Good potters  
 4. Good metal workers

- 1. I
- 2. II
- 3. III
- 4. IV

35. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Good
- 2. Bad
- 3. Ok
- 4. Good

36. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Good
- 2. Bad
- 3. Ok
- 4. Good

37. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. II and III

- 2. II and IV

- 3. II and V

- 4. II, III and V

38. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Good
- 2. Bad
- 3. Ok
- 4. Good

39. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. Good
- 2. Bad
- 3. Ok
- 4. Good

40. Consider the following statement made by a historian given below:  
 The Indus Valley Civilization is known as the Indus Valley because it was located near the Indus River.

- 1. II and III
- 2. II and V
- 3. II, III and IV
- 4. II, III and V

29. Which of the following statements, referred to Nelson Mandela's views, is NOT correct?

I. The increasing in South Africa was not always the same.  
II. He got the support of the people without much trouble.  
III. Education took many long, difficult years.  
IV. Truth is the best option always.

- A. I and II  
B. I, II and IV  
C. II, III and V  
D. I, III and IV

30. Which of the following statements relating to the 'National Curriculum Policy' in India is correct?

I. The English replaced the Sanskrit.  
II. Teachers were taught in the English.  
III. The education system was reformed.  
IV. The citizens were encouraged to expand education in their local areas.

- A. I and II  
B. I, III and IV  
C. II and IV  
D. I, III and V

31. Which of the following statements about opinion poll is correct during the elections to the parliament?

I. The result is decided well after the poll has been held.  
II. The results are higher than the turnout.  
III. The election pollution was increased due to media that were not under the Polling.  
IV. People were going more advance from the different stations before the opinion.

- A. I, II and I  
B. I and IV  
C. II and IV  
D. I, II and IV

32. Amongst the following which statement is true regarding the Indian economy?

I. It depends on the agriculture.  
II. It is not able to reduce its dependency on agriculture.  
III. India produces more vegetables than it needs.  
IV. India exports a lot of vegetables.

- A. I, II and III  
B. I, II and IV  
C. I, III and V  
D. I, II, III and IV

33. What is the main difference between the two types of the religions?

I. Hinduism is a religion based on the caste system.  
II. Hinduism does not believe in one God.  
III. Hinduism believes in the concept of Karma.  
IV. Hinduism is a religion based on the caste system.

- A. I and II  
B. I, II and III  
C. I and IV  
D. II, III and IV

34. Which of the following statement is correct about the Indian culture?

I. Indian culture is highly developed.  
II. Indian culture is highly developed.  
III. Indian culture is highly developed.  
IV. Indian culture is highly developed.  
V. Indian culture is highly developed.

- A. I, II and III  
B. I, II and IV  
C. I, II and V  
D. II, III and IV

35. Describe the main picture taken from the famous illustration by Raja Ravi Varma.

36. Study each graph and compare all the data given below:



What does the image represent?

(a) Ganga Aarti or Agam Kirtan

- A. Swimming  
B. Water rafting  
C. Water park  
D. Rock climbing

- A. Holi  
B. Independence Day  
C. Republic Day  
D. Rajasthani festival

37. Who were fighters of the Indian independence movement?

38. During which period did the Indian independence movement?

I. They went to the capital cities and took control of power.  
II. They were many the powerful provinces and did not fight together.  
III. They were scattered and the struggle took place in the whole of the country.  
IV. They were at the borders and were in conflict with the British government.

I. All around world, across America, Europe, Asia, Africa, Australia and Africa.  
II. India became a member of the UN in 1947.  
III. India became a member of the UN in 1947.  
IV. India became a member of the UN in 1947.  
V. India became a member of the UN in 1947.

34. Which of the following would be the part of the surroundings of a closed up Bazaar during the colonial period?
  - A large number of people live in slums.
  - A large population of people belonging to depressed and new classes.
  - Slums are neighbourhoods being used for a variety of activities such as working, washing and sleeping.
  - Quarters are allotted in any open spot.
  - I, II and III
  - I, III and IV
  - II and IV
  - II, III and IV
35. Which of the following statements are true in the context of Cricket in Victorian England?
  - The rules of Cricket were made in favor those who were described as 'Elites'.
  - The wages of professionals were paid by patronage or false price of patronage.
  - Cricket was viewed as a way of training English boys discipline, importance of hierarchy and leadership qualities.
  - The no. of players were varied numbers.
  - I, II and III
  - I, II and IV
  - I, III and IV
  - II, III and IV
36. Who were regarded as 'elites' or the most well known?
  - 1850' Standard bearers during the British Empire.
  - Officers below than the General of the British Army.
  - Men who gather together during winter to go around.
  - Men and Colonists from Europe.
  - I, II and III
  - I, II and IV
  - II, III and V
  - II, III and IV
37. Which of the following statement is correct in relation to 1860' cricket?
  - Revolution in the field of laws.
  - The National Assembly had opened its business with a wide dispensation has been.
  - Cricket was also played in different countries including the United States of America.
  - The Committee of the Legislative Council diverse in the cricket world possessed.
  - II, III
  - None A
  - None B
  - None C and D
38. Which of the following statements are true in the context of India in Slave in Europe?
  - They spent the majority power of their body.
  - They would segregate the rights of Indians against Europeans.
  - They brought the Indian population in slavery.
  - They served in various roles because all Indian women will marry.
  - None A
  - None B
  - None C
  - None D
- Directions (Question nos. 39 – 40):**
- Read the statements and select the correct answer from the options given below.
39. Statement I: Statement II is true.
40. Statement I is also, since only one of the statements in Part B is true, Statement I is also vice versa to Statement II.
41. Statement I and Statement II are both true.
42. Statement I is true, while Statement II is not provided enough information.
43. Statement I is false, while Statement II is true.
44. Statement I: The Indian War is known as India's First War of Independence.
- Statement II: the Indian War is known as India's First War of Independence.
- Both Statement I and Statement II are true.
  - Only Statement I is true.
  - Only Statement II is true.
  - Both Statement I and Statement II are false.

41. Statement B: It is easier to move a ship by the bow than by the stern.

Statement B: The parts of several well-known structures collapsed during the 19th century.

42. Statement A: The Board of India gave a cash award of ₹ 10,000 to the Museum of India.

Statement B: A government grant for the restoration of buildings to gain a right to sue in a court of law.

43. If  $\frac{1}{x} = \frac{1}{y}$ , where  $x$  and  $y$  are both non-zero, then  $x^2 + y^2$  is equal to

- A. 0  
B. 24  
C. 10  
D. 16

44. Given that  $\sqrt{a^2 + b^2} = 10 + 1$  is equal to

- A. 9.03  
B. 9.99  
C. 20.01  
D. 27.1

45. Let  $P(x)$  be a polynomial of degree 3 such that  $\frac{1}{x}$  for  $x = 1, 2, 3, \dots, 10$  the value of  $P(x)$  is

- A. 0  
B. 2  
C. 4  
D. 6

46. If  $a$  and  $b$  are the roots of the equation  $x^2 - 8x + 15 = 0$ , then the value of  $a^2 + b^2$  is equal to

- A. 16  
B. 20  
C. 24  
D. 30

47. Statement A: The average weight of 10 students is 50 kg and their average height is 150 cm.

Statement B: The average height of 10 students is 150 cm and their average weight is 50 kg.

48. Statement A: The average age of 10 students is 15 years and their average height is 150 cm.

Statement B: The average age of 10 students is 15 years and their average height is 150 cm.

49. Statement A: The average age of 10 students is 15 years and their average height is 150 cm.

Statement B: The average age of 10 students is 15 years and their average height is 150 cm.

50. Statement A: The number of students in a class is 12 and the average age of the students is 15 years. If the average age of the students is 14 years, then the number of students in the class is 12 plus or minus 8 plus or minus 10.

- A. 10  
B. 12  
C. 14  
D. 16

51. If  $\frac{1}{x} = \frac{1}{y}$  and  $x \neq 0$ , then which of the following is true?

- A.  $x = 100$   
B.  $y = 100$   
C.  $x = 10$   
D.  $y = 10$

52. If  $\frac{1}{x} = \frac{1}{y}$ , then the value of  $x + y$  is equal to

- A.  $\frac{1}{x+y}$   
B.  $\frac{x+y}{xy}$   
C.  $\frac{xy}{x+y}$   
D.  $x+y$

53. Statement A: The area of a solid sphere is 36 cm<sup>2</sup>. A spherical particle is the spherical distance of 3 cm from the center so that the area of the curved surface area of the particle is the same as the total surface area of the larger part of the sphere is 4.

- A. 6  
B. 12  
C. 18  
D. 24

54. Statement A: The volume of a cylinder is 100 m<sup>3</sup>. If the radius of the cylinder is 2 m, then the height of the cylinder is 25 m.

- A. 0  
B. 2  
C. 10  
D. 100

55. Statement A: The sum of 12 and 14 is equal to 26. If the average of two numbers is 10, then the sum of the two numbers is 20.

- A. 10  
B. 12  
C. 14  
D. 16

56. Statement A: The sum of 12 and 14 is equal to 26. If the average of two numbers is 10, then the sum of the two numbers is 20.

- A. 10  
B. 12  
C. 14  
D. 16

57. Statement A: The sum of 12 and 14 is equal to 26. If the average of two numbers is 10, then the sum of the two numbers is 20.

- A. 10  
B. 12  
C. 14  
D. 16

58. Statement A: The volume of a solid sphere is 36 cm<sup>2</sup>. A spherical particle is the spherical distance of 3 cm from the center so that the area of the curved surface area of the particle is the same as the total surface area of the larger part of the sphere is 4.

- A. 6  
B. 12  
C. 18  
D. 24

59. Statement A: The volume of a cylinder is 100 m<sup>3</sup>. If the radius of the cylinder is 2 m, then the height of the cylinder is 25 m.

- A. 0  
B. 2  
C. 10  
D. 100

80. The vertical size of corner-based cellular phone antenna is 1 cm and its horizontal size is 2 cm. If it is placed in such a way that its front face lies along the vertical axis, then the maximum distance between the two tips of the antenna is
- 1 cm
  - 2 cm
  - 3 cm
  - 4 cm
  - 5 cm
- If the heights of each turn made by the antenna are 1 cm, then the total height of the antenna is
- 1.288
  - 0.11
  - 6.11
  - 7.7
81. A 300 Hz frequency of air, 20 cm Hg height of the water, 1000 N/m<sup>2</sup> atmospheric pressure, 300 K absolute temperature, density of air = 1.2 kg/m<sup>3</sup>, density of water = 1000 kg/m<sup>3</sup>. The time period of oscillation of a simple pendulum of length 1 m is
- $\sqrt{g} \approx 4.47$
  - $\sqrt{g} \approx 1.41$
  - $\sqrt{g} \approx 0.77$
  - $\sqrt{g} \approx 0.38$
  - $\sqrt{g} \approx 0.11$
82. A particle moves with constant velocity  $v_0$  along a straight line. During its motion, it passes through point  $P$  at time  $t_0$  and point  $Q$  at time  $t_1$ . The distance between  $P$  and  $Q$  is
- $v_0(t_1 - t_0)$
  - $v_0(t_1 + t_0)$
  - $v_0(t_1^2 - t_0^2)$
  - $v_0(t_1^2 + t_0^2)$
  - $v_0(t_1^2 - t_0)$
83. It is known that mass of cyclotron magnet is  $M$  and the magnetic field is  $B$ . The radius of the circular path of a proton in the cyclotron is
- $\sqrt{\frac{qB}{M}}$
  - $\sqrt{\frac{qB}{M}}$
  - $\sqrt{\frac{qB}{M}}$
  - $\sqrt{\frac{qB}{M}}$
  - $\sqrt{\frac{qB}{M}}$
84. Two cars, A and B, move towards each other on a straight horizontal road. Car A moves with a speed of  $10\text{ m/s}$  and car B moves with a speed of  $20\text{ m/s}$ . The distance between them is  $100\text{ m}$ . The time taken by them to meet is
- 1 s
  - 2 s
  - 3 s
  - 4 s
  - 5 s
85. Let  $D$  be the period of a wave of frequency  $f$ . If  $f$  is doubled, then  $D$  becomes
- $\frac{1}{2}f$
  - $\frac{1}{4}f$
  - $\frac{1}{8}f$
  - $\frac{1}{16}f$
  - $\frac{1}{32}f$
86. A 0.5 kg mass is suspended from a string of length 1 m. The angle between the string and the vertical is  $30^\circ$ . The tension in the string is
- 1 N
  - 2 N
  - 3 N
  - 4 N
  - 5 N
87. A 0.5 kg mass is suspended from a string of length 1 m. The angle between the string and the vertical is  $30^\circ$ . The tension in the string is
- 1 N
  - 2 N
  - 3 N
  - 4 N
  - 5 N

56. Let  $ABC$  be a triangle with sides  $a, b, c$ . Then the lengths of medians of the triangle formed in the midpoints of the triangle are

$$\begin{array}{l} 1. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 2. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 3. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 4. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 5. \frac{5}{6}a, \frac{5}{6}b, \frac{5}{6}c \end{array}$$

57. If  $(x+1)^k$  divides by  $(y-1)^l$ , then the remainder of  $x^k - y^l$  is

$$\begin{array}{l} 1. 16 \\ 2. 0 \\ 3. 16 \\ 4. 32 \end{array}$$

58. A vehicle passes through the vertices of a triangle  $ABC$ . If the vertices are  $A(-2, 3)$ ,  $B(2, -3)$ ,  $C(-1, 0)$  from the centre of the circle?

$$\begin{array}{l} 1. (-0, 0) \\ 2. (0, 1) \\ 3. (-2, 1) \\ 4. (0, -3) \end{array}$$

59. If two dice are thrown together, the probability that the difference of the numbers appearing on them is up to 4 is

$$\begin{array}{l} 1. \frac{5}{6} \\ 2. \frac{1}{4} \\ 3. \frac{5}{9} \\ 4. \frac{1}{12} \\ 5. \frac{1}{16} \end{array}$$

60. If  $\angle AHB = 90^\circ$  and  $\overline{AB}$  and  $\overline{CD}$  are two perpendicular chords of a circle with center  $O$  such that  $OA = OC$ .

$$\begin{array}{l} 1. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 2. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 3. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 4. \frac{1}{2}a, \frac{1}{2}b, \frac{1}{2}c \\ 5. \frac{5}{6}a, \frac{5}{6}b, \frac{5}{6}c \end{array}$$

59. If  $(x+1)^k$  divides by  $(y-1)^l$ , then the remainder of  $x^k - y^l$  is

$$\begin{array}{l} 1. 16 \\ 2. 0 \\ 3. 16 \\ 4. 32 \end{array}$$

58. A vehicle passes through the vertices of a triangle  $ABC$ . If the vertices are  $A(-2, 3)$ ,  $B(2, -3)$ ,  $C(-1, 0)$  from the centre of the circle?

$$\begin{array}{l} 1. (-0, 0) \\ 2. (0, 1) \\ 3. (-2, 1) \\ 4. (0, -3) \end{array}$$

59. If two dice are thrown together, the probability that the difference of the numbers appearing on them is up to 4 is

$$\begin{array}{l} 1. \frac{5}{6} \\ 2. \frac{1}{4} \\ 3. \frac{5}{9} \\ 4. \frac{1}{12} \\ 5. \frac{1}{16} \end{array}$$

61. If  $\angle AHB = 90^\circ$  and  $\overline{AB}$

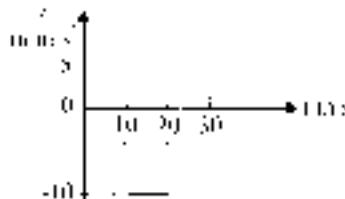
and  $\overline{CD}$  are two perpendicular chords of a circle with center  $O$  such that  $OA = OC$ .

62. If the above data has mean  $75^\circ$ , then the sum of the angles  $\alpha$  and  $\beta$  respectively

- 18 and 24
- 24 and 36
- 36 and 48
- 48 and 60
- 60 and 72

#### Directions (Questions 63 - 67)

- Suppose that the speed limit is  $100\text{ km/h}$ . A person who starts from rest at  $t = 0$  is shown in the figure.



63. At what instant does the particle come to rest for the first time?

1.  $5\text{ s}$
2.  $10\text{ s}$
3.  $15\text{ s}$
4. The particle never comes to rest.

64. What is the total distance travelled by the particle during  $0 \leq t \leq 30$ ?

1.  $100\text{ km}$
2.  $150\text{ km}$
3.  $200\text{ km}$
4.  $300\text{ km}$

65. If  $\alpha$  and  $\beta$  are acute angles such that

Classified	$0^\circ < \alpha < 20^\circ$	$20^\circ < \alpha < 40^\circ$	$40^\circ < \alpha < 60^\circ$	$60^\circ < \alpha < 80^\circ$	$80^\circ < \alpha < 100^\circ$
Frequency	1	2	3	4	5

66. In the above data, if  $\alpha$  is acute angle, then  $\cos \alpha$  is

1. 0.707
2. 0.866
3. 0.939
4. 0.964
5. 0.984

#### Answers (Questions 1 - 62)

1. D 2. A 3. B 4. C 5. E 6. B 7. C 8. D 9. A 10. B 11. C 12. D 13. E 14. A 15. B 16. C 17. D 18. E 19. A 20. B 21. C 22. D 23. E 24. A 25. B 26. C 27. D 28. E 29. A 30. B 31. C 32. D 33. E 34. A 35. B 36. C 37. D 38. E 39. A 40. B 41. C 42. D 43. E 44. A 45. B 46. C 47. D 48. E 49. A 50. B 51. C 52. D 53. E 54. A 55. B 56. C 57. D 58. E 59. A 60. B 61. C 62. D

63. A 64. C 65. B 66. D 67. E

1.  $0.707$
2.  $0.866$
3.  $0.939$
4.  $0.964$
5.  $0.984$

68. If  $\alpha$  and  $\beta$  are acute angles such that

1.  $10^\circ$
2.  $20^\circ$
3.  $30^\circ$
4.  $40^\circ$

40. An object of mass  $5 \text{ kg}$  is moving at a constant velocity of  $10 \text{ m/s}$  towards the right. A horizontal force of  $2 \text{ N}$  to the left is applied to the object.



Which one of the following arguments is correct for the motion of the object?

- The magnitude of the friction force is  $5 \text{ N}$  to the left.
  - The momentum of the object increases by  $2 \text{ kg m/s}$ .
  - The momentum of the object increases by  $10 \text{ kg m/s}$ .
  - The change in momentum can only be known as time passes.
41. Two cars, A and B, start at the same instant from the same point. Car A travels straight west at  $30 \text{ m/s}$  and car B travels straight north at  $20 \text{ m/s}$ . After  $10 \text{ s}$ , the angle between the two cars is
- A.  $30^\circ$   
B.  $45^\circ$   
C.  $60^\circ$   
D.  $90^\circ$

42. A ball is thrown upwards with an initial velocity of  $10 \text{ m/s}$ . The ball reaches a maximum height of  $5 \text{ m}$  above the ground. The ball then falls back to the ground. The ball's velocity when it reaches the ground is
- A.  $10 \text{ m/s}$   
B.  $15 \text{ m/s}$   
C.  $20 \text{ m/s}$   
D.  $25 \text{ m/s}$

43. A bullet of mass  $5 \text{ g}$  is moving at a constant velocity of  $1000 \text{ m/s}$  towards the right.

45. The gravitational potential energy difference per unit mass between the surface of a planet and a point  $100 \text{ m}$  above it is  $1000 \text{ J/kg}$ . How much work is required to be done to move a  $50 \text{ kg}$  object from the surface of the planet up a slope of  $30^\circ$  at a constant rate?

- A.  $1750 \text{ J}$   
B.  $2250 \text{ J}$   
C.  $4150 \text{ J}$   
D.  $5000 \text{ J}$

46. An object of mass  $2 \text{ kg}$  has an initial speed of  $10 \text{ m/s}$  along the horizontal axis. It is subjected to a constant force of  $10 \text{ N}$  in the direction of motion. The object's final speed is
- A.  $12.5 \text{ m/s}$   
B.  $15 \text{ m/s}$   
C.  $17.5 \text{ m/s}$   
D.  $20 \text{ m/s}$

#### Questions 47–50: Read the following statements and choose the correct answer.

- Object A has a mass of  $4 \text{ kg}$  and is falling vertically downwards at  $10 \text{ m/s}$ .
- Object B has a mass of  $2 \text{ kg}$  and is falling vertically downwards at  $10 \text{ m/s}$ .
- Both objects have the same initial speed.
- Both objects have the same initial kinetic energy.

47. Which statement is true about the objects A and B?
- Object A has more kinetic energy than object B.
  - Object B has more kinetic energy than object A.
  - Both objects have the same kinetic energy.
  - Both objects have different kinetic energies.

48. If both objects fall from the same height, which object will reach the ground first?
- Object A
  - Object B
  - Both objects will reach the ground at the same time.
  - Neither object will reach the ground.

#### Directions (Questions 46–47)

- Two identical objects A and B are given a push so that they're moving along the same vertical line in opposite directions at the same instant. Object A is dropped from rest from a height  $H$  above the ground and object B is projected vertically upward from the ground with speed  $H$ .

46. At what height above the ground do they collide?

- A.  $0.4H$   
B.  $0.5H$   
C.  $0.7H$   
D.  $1.1H$

#### Directions (Questions 48–50)

- Two identical objects A and B are given a push so that they're moving along the same vertical line in opposite directions at the same instant. Object A is dropped from rest from a height  $H$  above the ground and object B is projected vertically upward from the ground with speed  $H$ .

47. Which object has greater kinetic energy?

- A. Object A  
B. Object B  
C. Both objects have the same kinetic energy.  
D. It is impossible to tell.

67. When the  $\omega$  in a ring disk is reduced to  $30\%$  of its original value, the new equilibrium radius is

  - $R$
  - $2 \times R$
  - $3 \times R$
  - $4 \times R$

4b. Consider how an individual's genetic variation in sensitivity to pheromone can limit mating with individuals of the same allele frequency, thus reducing the maximum number of potential mates.



What will be the product of the wave in the next iteration?

- |    | விவரம் |
|----|--------|
| 1. | விவரம் |
| 2. | விவரம் |
| 3. | விவரம் |
| 4. | விவரம் |

49. A wire segment of a certain length is folded back and forth in the middle and kept suspended by a string as shown in figure 4. The length of the wire is

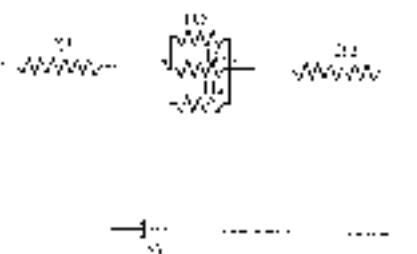
- a. creating a new class
- b. defining the class
- c. defining the objects
- d. creating an object by passing values to the constructor

70. In the evening press, the article was examined by the  
bureaus in London, the content being agreed upon by  
the British weekly for the whole of Europe.

प्रा. अ. विद्युत एवं विद्युत विभाग  
का विद्युत विभाग विद्युत  
विभाग की विभागीय विभाग  
विभागीय विभाग विभाग  
विभागीय विभाग विभाग

1. **Arbeits**
  2. **reichtat**  
maximieren möglichst,
  3. **definieren** der einzelnen soz. normen  
oder sozialen Gewohnheiten, Leidestypen  
soziale Regel' normen zu erläutern  
ausdrücken.

11. මෙම සංඛ්‍යා නිසුම නිශ්චිත ප්‍රතිඵලියක් නො ඇති අතර මෙම සංඛ්‍යා නිසුම නිශ්චිත ප්‍රතිඵලියක් නො ඇති අතර මෙම සංඛ්‍යා නිසුම නිශ්චිත ප්‍රතිඵලියක් නො ඇති අතර මෙම සංඛ්‍යා නිසුම නිශ්චිත ප්‍රතිඵලියක් නො ඇති අතර



1. 0.  
2. 1.  
3. 2.  
4. 3.  
5. 4.

1. A cylindrical container contains a small amount of oil which is being stirred clockwise by a rotating stirrer. The stirrer is horizontally positioned in the center of the cylinder. The stirrer rotates at a constant angular velocity of  $\omega$  rad/s. The oil has a density of  $\rho$  kg/m<sup>3</sup> and its viscosity is  $\eta$  N s/m<sup>2</sup>. The stirrer has a radius of  $R$  m and is rotating in the counter-clockwise direction.



Fig. 1

Consider two vertical rays made of uniform rod-like structures shown in Fig. 2 and 3. In Fig. 2 points A and B are diametrically opposite to each other. (Fig. 2) (Fig. 3)

then initially all



Fig. 2

- 1. Point A and B are static
- 2. Point A and B are moving
- 3. Point A is moving upwards
- 4. Point B is moving downwards

4. A cylindrical container is rotating about its central longitudinal axis with a constant angular velocity of  $\omega$  rad/s. The container has a radius of  $R$  m and a height of  $H$  m. The container is filled with water up to a height of  $H/2$ . The density of water is  $\rho$  kg/m<sup>3</sup> and its viscosity is  $\eta$  N s/m<sup>2</sup>. The water surface is flat. The water surface is flat.



Fig. 3

5. A rigid cylinder is being rotated clockwise about its axis. At the same time, the cylinder is being rotated counter-clockwise about its horizontal diameter such that  $\omega_A = \omega_B$ .

Accordingly, the system

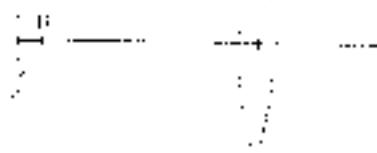


Fig. 4

- 1. Is accelerated upwards
- 2. Is decelerated upwards
- 3. Is decelerated downwards
- 4. Is accelerated downwards

6. A cylindrical container is rotating about its central longitudinal axis with a constant angular velocity of  $\omega$  rad/s. The container has a radius of  $R$  m and a height of  $H$  m. The container is filled with water up to a height of  $H/2$ . The density of water is  $\rho$  kg/m<sup>3</sup> and its viscosity is  $\eta$  N s/m<sup>2</sup>. The water surface is flat.

7. Earth's orbital speed is  $v$  km/h. The orbital radius of the planet is  $r$  km. The orbital period of the planet is  $T$  hours. Then the orbital velocity of the planet is



	85
A.	0.02
B.	0.2
C.	0.74

8. What is the current supplied by the battery in the circuit shown below? Current source value is 0.5 A and the voltage difference is 10 V.

9. A car weighing 1000 kg moves along a straight road at a constant speed of 20 m/s. The engine develops 100 kW of power. The engine force acting on the car is



	100 N
A.	10 N
B.	100 N
C.	1000 N
D.	10000 N



79. Which of the following structures of  $\text{SO}_2$  is correct?

- I.  $\text{MgSO}_4$  (sp. gr. 1.75) +  $\text{H}_2\text{O}$  (l)  
Mp. 100<sup>o</sup>
- II.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- III.  $\text{MgSO}_4$  (l) +  $\text{CuSO}_4$  (l)  
Mp. 100<sup>o</sup>
- IV.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- V.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- VI.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- VII.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)
- VIII.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)

79. **a. Polysulfide** **b. Zinc sulfide**

- I.  $\text{MgSO}_4$  (sp. gr. 1.75) +  $\text{H}_2\text{O}$  (l)  
Mp. 100<sup>o</sup>
- II.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- III.  $\text{MgSO}_4$  (l) +  $\text{CuSO}_4$  (l)  
Mp. 100<sup>o</sup>
- IV.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- V.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- VI.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)  
Mp. 100<sup>o</sup>
- VII.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)
- VIII.  $\text{CuSO}_4$  (l) +  $\text{ZnCl}_2$  (l)

80. **a. Zinc sulfide** **b. Zinc polysulfide**  
**c. Zinc polysulfide** **d. Zinc sulfide**

**e. Zinc polysulfide** **f. Zinc sulfide**  
**g. Zinc polysulfide** **h. Zinc sulfide**

**i. Zinc polysulfide** **j. Zinc sulfide**  
**k. Zinc polysulfide** **l. Zinc sulfide**

**m. Zinc polysulfide** **n. Zinc sulfide**  
**o. Zinc polysulfide** **p. Zinc sulfide**

**q. Zinc polysulfide** **r. Zinc sulfide**  
**s. Zinc polysulfide** **t. Zinc sulfide**  
**u. Zinc polysulfide** **v. Zinc sulfide**

81. **a. Zinc sulfide** **b. Zinc polysulfide**  
**c. Zinc polysulfide** **d. Zinc sulfide**

**e. Zinc polysulfide** **f. Zinc sulfide**  
**g. Zinc polysulfide** **h. Zinc sulfide**

**i. Zinc polysulfide** **j. Zinc sulfide**  
**k. Zinc polysulfide** **l. Zinc sulfide**

**m. Zinc polysulfide** **n. Zinc sulfide**  
**o. Zinc polysulfide** **p. Zinc sulfide**

**q. Zinc polysulfide** **r. Zinc sulfide**  
**s. Zinc polysulfide** **t. Zinc sulfide**  
**u. Zinc polysulfide** **v. Zinc sulfide**

82. Two organic compounds A and B react with sulfuric acid and both produce the same gas X. On reaction with excess hydrogen sulfide each compound B reacts to give a gas Y. Identity of A, B, X and Y

- I. A - Ethylene B - Ethyl Alcohol  
X - Sulfur dioxide, Y - Hydrogen
- II. A - Ethyl Alcohol, B - Acetone  
X - Hydrogen, Y - Carbon dioxide
- III. A - Methyl alcohol, B - Ethyl alcohol  
X - Hydrogen, Y - Carbon dioxide
- IV. A - Acetone, B - Ethyl alcohol  
X - Carbon dioxide, Y - Hydrogen

82. **a. Ethylene** **b. Ethyl alcohol**  
**c. Sulfur dioxide** **d. Hydrogen**

- I. A - Ethylene B - Ethyl alcohol  
X - Sulfur dioxide, Y - Hydrogen
- II. A - Ethyl alcohol, B - Acetone  
X - Hydrogen, Y - Carbon dioxide
- III. A - Methyl alcohol, B - Ethyl alcohol  
X - Carbon dioxide, Y - Hydrogen
- IV. A - Acetone, B - Ethyl alcohol  
X - Carbon dioxide, Y - Hydrogen

82. **a. Ethylene** **b. Ethyl alcohol**  
**c. Sulfur dioxide** **d. Hydrogen**

**e. Ethylene** **f. Ethyl alcohol**  
**g. Sulfur dioxide** **h. Hydrogen**

**i. Ethylene** **j. Ethyl alcohol**  
**k. Sulfur dioxide** **l. Hydrogen**

**m. Ethylene** **n. Ethyl alcohol**  
**o. Sulfur dioxide** **p. Hydrogen**

**q. Ethylene** **r. Ethyl alcohol**  
**s. Sulfur dioxide** **t. Hydrogen**

**u. Ethylene** **v. Ethyl alcohol**  
**w. Sulfur dioxide** **x. Hydrogen**

85. Match Chemical reactions given in the column I with the types of the reaction given in column II and write the correct answer using the options given below.

Column I	Column II
(Chemical Reactions)	(Type of Chemical Reactions)
A. Ignition of $\text{NH}_3$ from N and O	I. Decomposition
B. Combustion of zinc carbonate	II. Double displacement
C. Reaction of aqueous BaCl <sub>2</sub> solution with dilute H <sub>2</sub> SO <sub>4</sub>	III. Displacement
D. Rancidity of oils	IV. Reduction
E. $\text{Na}_2\text{O}_2 + \text{H}_2\text{O} \rightarrow 2\text{NaOH}$	V. Displacement
F. $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$	
G. $\text{Na}_2\text{S} + \text{CuSO}_4 \rightarrow \text{CuS} + \text{Na}_2\text{SO}_4$	
H. $\text{Na}_2\text{CO}_3 + \text{Ca(OH)}_2 \rightarrow \text{CaCO}_3 + \text{NaOH}$	
I. $\text{Na}_2\text{O}_2 + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$	
J. $\text{Na}_2\text{O}_2 + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{O}_2$	

86. **Question:** List three soluble sulphate salts which are decomposed by heat.
- Answer:**  $\text{Na}_2\text{SO}_4$ ,  $\text{K}_2\text{SO}_4$ ,  $\text{MgSO}_4$ ,  $\text{CaSO}_4$ ,  $\text{BaSO}_4$ ,  $\text{Al}_2(\text{SO}_4)_3$ ,  $\text{Fe}_2(\text{SO}_4)_3$ ,  $\text{ZnSO}_4$ ,  $\text{CuSO}_4$ ,  $\text{MnSO}_4$ ,  $\text{PbSO}_4$ ,  $\text{Ag}_2\text{SO}_4$ ,  $\text{SrSO}_4$ ,  $\text{BaSO}_4$ ,  $\text{Al}_2(\text{SO}_4)_3$ ,  $\text{Fe}_2(\text{SO}_4)_3$ ,  $\text{ZnSO}_4$ ,  $\text{CuSO}_4$ ,  $\text{MnSO}_4$ ,  $\text{PbSO}_4$ ,  $\text{Ag}_2\text{SO}_4$ ,  $\text{SrSO}_4$ .

87. A mixture of aqueous solutions of three salts A, B and C (2.5 drops of blue litmus paper, red litmus paper and phenolphthalein were added to each of these solution to separate experiments). The change in colour of different reagents is summarized in the following table.

88. **Question:** A 0.5 molal  $\text{Na}_2\text{S}_2\text{O}_3$  solution was titrated against  $\text{I}_2$  solution. 2-3 drops of blue litmus paper, red litmus paper and phenolphthalein were added to each of these solution to separate experiments. The change in colour of different reagents is summarized in the following table.

Reagent	With Blue Litmus Paper	With Red Litmus Paper	With Phenolphthalein Solution
A. $\text{Na}_2\text{S}_2\text{O}_3$	Blue	Red	Blue
B. $\text{I}_2$	Blue	Blue	Blue
C. $\text{Na}_2\text{S}$	Blue	Blue	Red
D. $\text{Na}_2\text{CO}_3$	Blue	Blue	Red
E. $\text{Na}_2\text{SO}_4$	Blue	Blue	Red
F. $\text{Na}_2\text{SiO}_3$	Blue	Blue	Red
G. $\text{Na}_2\text{CrO}_4$	Blue	Blue	Red
H. $\text{Na}_2\text{O}_2$	Blue	Blue	Red
I. $\text{Na}_2\text{S}_2\text{O}_5$	Blue	Blue	Red
J. $\text{Na}_2\text{O}_2$	Blue	Blue	Red

**Answer:** On the basis of above observations, identify A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.

- A.  $\text{NaCl}$ , B.  $\text{Na}_2\text{CO}_3$ , C.  $\text{CH}_3\text{COONa}$   
 B. A.  $\text{NaCl}$ , B.  $\text{CH}_3\text{COONa}$ , C.  $\text{NaCl}$   
 C. A.  $\text{NaCl}$ , B.  $\text{Na}_2\text{CO}_3$ , C.  $\text{CH}_3\text{COONa}$   
 D. A.  $\text{CH}_3\text{COONa}$ , B.  $\text{NaCl}$ , C.  $\text{NaCl}$   
 E. A.  $\text{CH}_3\text{COONa}$ , B.  $\text{NaCl}$ , C.  $\text{NaCl}$

- F. A.  $\text{NaCl}$ , B.  $\text{Na}_2\text{CO}_3$ , C.  $\text{CH}_3\text{COONa}$   
 G. A.  $\text{NaCl}$ , B.  $\text{CH}_3\text{COONa}$ , C.  $\text{NaCl}$   
 H. A.  $\text{NaCl}$ , B.  $\text{Na}_2\text{CO}_3$ , C.  $\text{CH}_3\text{COONa}$   
 I. A.  $\text{CH}_3\text{COONa}$ , B.  $\text{NaCl}$ , C.  $\text{NaCl}$

88. Which of the following is best suited with the following system and security needs associated with the current job?

- | Job                    | Tool         |
|------------------------|--------------|
| Muster to be Separated | Virtual tool |
| A. Account             | Customer     |
| B. Cost of Blue        | Supplier     |
| C. Sales of M&T owner  | Tool         |
| D. KPIs for CIO        | Tool         |
| E. JNK                 | Virtual tool |
- A. A, B, C, D, E  
B. A, B, C, D, E  
C. A, B, C, D, E  
D. A, C, D, E  
E. A, B, C, D, E

89. Set the `setenv.sh` command regular and its position as we need to do the configuration below:

- A. Virtual machine
- B. Few temporary servers
- C. Few temporary compute instances
- D. Virtual machine

- E. I and P
- F. In Network
- G. Host
- H. Public IP

90. Consider the following statement:  
Statement 1: `curl -X POST https://api.github.com/repos/username/repo_name/branches/main/protected`  
Statement 2: `curl -X POST https://api.github.com/repos/username/repo_name/branches/main/protect`

- | Statement                                   | curl -X POST https://api.github.com/repos/username/repo_name/branches/main/protected |
|---|--|
| A. Statement 1 is equivalent to Statement 2 | True   |
| B. Statement 1 is equivalent to Statement 2 | False  |
| C. Statement 1 is equivalent to Statement 2 | True   |
| D. Statement 1 is equivalent to Statement 2 | False  |
| E. Statement 1 is equivalent to Statement 2 | True   |

- A. A, B, C, D, E  
B. A, B, C, D, E  
C. A, B, C, D, E  
D. A, B, C, D, E  
E. A, B, C, D, E

91. Identify the correct sequence of steps to download the latest version of a specific software from a public repository.

- A. Download the tarball file
- B. Extract the tarball file
- C. Remove the old binary
- D. Reinstall the new binary
- E. Verify the checksum

A. A, B, C, D, E  
B. A, B, C, D, E  
C. A, B, C, D, E  
D. A, B, C, D, E  
E. A, B, C, D, E

92. Which of the following options can be used to make a request to a departmental committee to review the proposed funding for projects A and B, respectively?

- A. Sub. Admin
- B. Sub. Unit Head
- C. MR. Chairman, ASAC
- D. MR. Compt. Nodal

93. Which one of the following statements is true which correctly explains the process of synthesis?

- A. Mesmerization of reactants by constrained synthesis inhibitors
- B. The process of synthesis is carried out in the presence of physical or chemical perturbations
- C. A process carried out in the presence of well-defined molecular environments known as reaction conditions or reaction media
- D. An enzyme catalyzes the synthesis of a product in the presence of a substrate
- E. An enzyme catalyzes the synthesis of a product in the presence of a substrate

A. A, B, C, D, E  
B. A, B, C, D, E  
C. A, B, C, D, E  
D. A, B, C, D, E  
E. A, B, C, D, E

94. A vendor has been retained to evaluate certain features of the system. The vendor's report is to be submitted to the concerned authority. Which of the following is the best choice?

- A. All existing system requirements
- B. All existing system and desired requirements
- C. All functional system requirements
- D. All functional system, along

95. Identify the correct sequence of steps to download the latest version of a specific software from a public repository.

- A. Download the tarball file
- B. Extract the tarball file
- C. Remove the old binary
- D. Reinstall the new binary
- E. Verify the checksum

A. A, B, C, D, E  
B. A, B, C, D, E  
C. A, B, C, D, E  
D. A, B, C, D, E  
E. A, B, C, D, E

90. Inverse relationship of plasma protein concentration to the thickness of plasma membrane is due to the presence of proteins in a membrane separating it from a body fluid. It means that the more the protein, less is the thickness of membrane in the plasma membrane. Is there any other reason for this?

1.  $\text{O}_2$
2.  $\text{CO}_2$
3.  $\text{H}_2$
4.  $\text{N}_2$

91. Selectivity of proteins in transport of small molecules may be explained by the types of cells, kidneys and liver. Why these cells functionally important at the plasma membrane?

Given the error diagram that the following processes:

1. Glucose diffuses across cell membrane.
2. Water moves across the membrane.
3. Water moves across the membrane.
4. Glucose moves across the membrane.

92. What one of the following organelles has a role in preparing the cell wall dissolved in glucose and its products is mainly and actively transported?

1. Nucleus
2. Endoplasmic reticulum
3. Mitochondria
4. Golgi apparatus

93. Glucose diffuses across the cell membrane. If the cell is surrounded by plasma membrane, then the glucose concentration in the cell will increase. But if the cell is surrounded by a semipermeable membrane, then the glucose concentration in the cell will decrease. Why?

1.  $\text{O}_2$
2.  $\text{CO}_2$
3.  $\text{H}_2$
4.  $\text{N}_2$

94. Which type of membrane has low oxygen permeability and high water permeability? Explain the reason.

- Given the error diagram below. The graph shows the relationship between the number of molecules of oxygen and carbon dioxide.

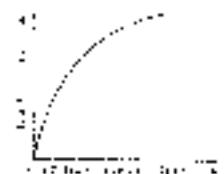
95. Two types of enzymes are present in the same cell. One enzyme acts on glucose and another on glucose + fructose. The first enzyme converts glucose to glucose + fructose. The second enzyme converts glucose + fructose to glucose + glucose + fructose.

1.  $\text{O}_2$
2.  $\text{CO}_2$
3.  $\text{H}_2$
4.  $\text{N}_2$

96. Which one of the following processes and structures is likely to undergo diffusion? Explain the reason.

1. Lipid bilayer membranes
2. Semipermeable membranes
3. Cellulose membranes
4. Sulfur-containing amino acids

97. A student was performing an experiment to measure the oxygen uptake during the respiration of isolated mitochondria. He heated the sample and then observed which graph showed the maximum rate of the mitochondrial respiration?



98. All three processes shown above by the student:

1. High oxygen consumption and high oxygen output.
2. Low oxygen consumption and low oxygen output.
3. High oxygen consumption and high oxygen output.
4. Low oxygen consumption and low oxygen output.

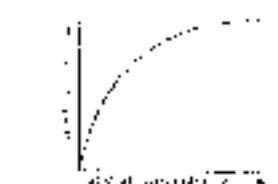
Given the error diagram below. The graph shows the relationship between the number of molecules of oxygen and carbon dioxide.

1.  $\text{O}_2$
2.  $\text{CO}_2$
3.  $\text{H}_2$
4.  $\text{N}_2$

99. Which one of the following statements is true about the glucose that enters the blood after absorption?

1. High oxygen content
2. High oxygen content
3. Glucose glucose glucose
4. High oxygen content

100. Which one of the following diagrams best describes an enzyme reaction?



Given the error diagram below:

1. Enzyme activity is high at earliest stage.
2. Enzyme activity is high at later stage.
3. Enzyme activity is constant throughout the reaction.

101. Given the graph below. The graph shows the relationship between the number of molecules of oxygen and carbon dioxide.

1. Enzyme activity is high at earliest stage.
2. Enzyme activity is high at later stage.
3. Enzyme activity is constant throughout the reaction.

1.  $\text{O}_2$
2.  $\text{CO}_2$
3.  $\text{H}_2$
4.  $\text{N}_2$

04. Glucose is the prime source of energy in our body. However, it is stored in the form of glycogen in the muscle and liver. It must be converted to the glucose in plants. As a result, every plant must require glucose as most hydrolytic enzymes which can convert starch present why does the plant store glucose instead of starch in free form?
- Glucose is more compact and more hydrophilic.
  - Storage of glucose in free form will consume less ATP.
  - Glucose - the free form stores more energy per unit mass.
  - Glucose is right carbon molecule for storing in the free form and results in unsaturated resonance in the ether.
05. The figure given below is designed to show yeast respiration. In one of the tubes there is yeast suspension in phosphate solution. 10% glucose was added before yeast was added to it. Which one of the following is the possible reason for boiling of sugar solution?
- 
06. Yeast produces CO<sub>2</sub> by respiration. The following statement is true about yeast respiration:
- Yeast can respire aerobically.
  - CO<sub>2</sub> is released by yeast during aerobic respiration.
  - Yeast can respire anaerobically without oxygen.
  - Alcohol is the end product of yeast respiration.
07. Yeast respiration can be explained by following equation:
- Aerobic
  - Anaerobic
  - Biotic
  - Cyclic
08. Spindle fibre erection would be detected even in nerve cells. But this is impossible because
- the brain is a central muscle. Thus, the motor neurons in the brain cannot contract.
  - nerve cells do not have contractile proteins.
  - nerve cells do not have contractile proteins.
  - nerve cells do not have contractile proteins.
09. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
10. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
11. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
12. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
13. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
14. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
15. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
16. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
17. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
18. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
19. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
20. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
21. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
22. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
23. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
24. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
25. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
26. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
27. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
28. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
29. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
30. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
31. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
32. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
33. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
34. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
35. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
36. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
37. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
38. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
39. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
40. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
41. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
42. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
43. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
44. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
45. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
46. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
47. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
48. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
49. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
50. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
51. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
52. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
53. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
54. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
55. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
56. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
57. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
58. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
59. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
60. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
61. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
62. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
63. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
64. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
65. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
66. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
67. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
68. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
69. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
70. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
71. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
72. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
73. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
74. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
75. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
76. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
77. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
78. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
79. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
80. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
81. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
82. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
83. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
84. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
85. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
86. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
87. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
88. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
89. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
90. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
91. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
92. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
93. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
94. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
95. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
96. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
97. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
98. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
99. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel
100. Which one of the following is not a good conductor of heat?
- Water
  - Oil
  - Alcohol
  - Steel

98. Which entity will be expected to maintain breeding pairs that are not part of a group? (Based on 1999 syllabus material from the end of 2001 before the explanatory statement)
- A population of two or more of the same species, and subspecies
  - Two separate flocks, each containing two species, the smaller one with many more birds than the bigger flock
  - Two flocks joined together for mutual protection, resulting in the formation of a mixed species and sex group, located on opposite sides of the habitat, yet a single subspecies
  - Two pairs of birds seeking two different food items by the same feeding in the form of mixed species and sex groups
99. It is generally observed that under the impact of mosquito infestation with their eggs, the water bodies become stagnant. Plaudine studies the fauna in these waters. The parasite which invades the mosquito into the human blood stream gets through skin, via the mosquito's salivary gland, through the vein, and finally reaches the brain capillaries of man.
- Malaria (sporogony) - Plasmodium spp. are present; Anopheles & A. gambiae, common in Africa, are potential vectors
  - Malaria transmission due to P. vivax, caused by Anopheles stephensi and A. dirus
  - Malaria transmitted via human blood, i.e.,  $\text{Anopheles} \times \text{Human RBC}$  sporogony  $\rightarrow$  mosquito  $\rightarrow$  eggs  $\rightarrow$  zygote  $\rightarrow$  sporozoite
  - Malaria transmission - Plasmodium spp. are present;  $\text{Anopheles} \times \text{Human RBC}$  sporogony  $\rightarrow$  mosquito  $\rightarrow$  eggs  $\rightarrow$  zygote  $\rightarrow$  sporozoite
100. Which bird behaviour is likely to prevent a predator from taking off and catching it? (Based on 1999 syllabus material from the end of 2001 before the explanatory statement)
- All birds that are in danger are likely to fly away
  - Most birds flying back to their nest to defend their nest against predators
  - Birds flying away from their nest to escape predators
  - Birds flying away from their nest to escape predators
101. A very cold environment causes the body to shiver. This is due to contraction of muscle fibres in a single zone. But, in certain cases where the body temperature is less than normal, the body shivers all over. Explain what is the expected outcome under such circumstances.
- Shivering at different places
  - Shivering at the same place
  - Body with increased heat
  - Body with reduced heat
102. Do you think the role of any organism in the world would be exceeded at ecological threshold? Explain. (Based on 1999 syllabus material from the end of 2001 before the explanatory statement)
- Only top predators have ecological thresholds
  - Living beings do not have
  - Micro-organisms have
  - Organisms which are at the bottom of the food chain

Rough Work / Chap 25

S

A

11. 22. Sat. 1.29G Total.

1