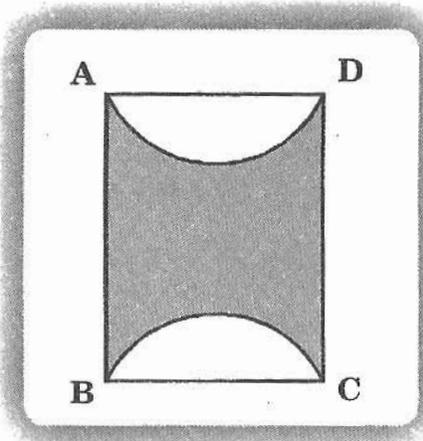


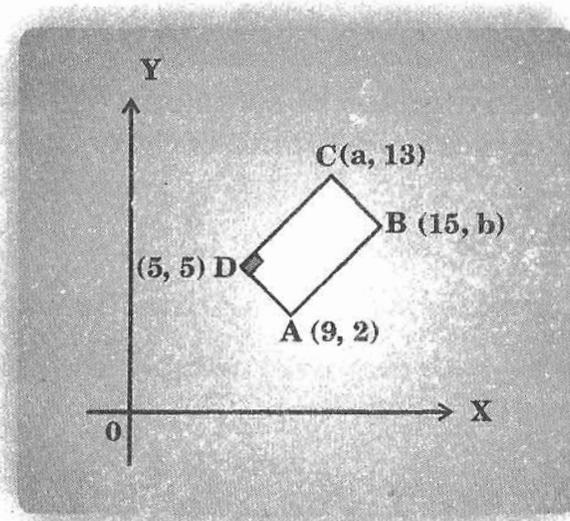
CLASS : X

MATHEMATICS

1. ABCD is a rectangle with AD = 10 cm. If the shaded area is 100 cm^2 , then the shortest distance between the semicircles is:



- (A) $2.5\pi \text{ cm}$ (B) $5\pi \text{ cm}$
 (C) $(2.5\pi + 5) \text{ cm}$ (D) $(2.5\pi - 2.5) \text{ cm}$
2. In the rectangle shown, the value of $a - b$ is:



- (A) -3 (B) -1 (C) 3 (D) 1
3. Find the sum of all values of "x", so that

$$16^{(x^2+3x-1)} = 8^{(x^2+3x+2)}$$

- (A) 0 (B) 3 (C) -3 (D) -5

4. Solve for x , given $y = x^2 - 1$ and $x = 2y + 1$.

- (A) $x \in \{0, 1\}$ (B) $x \in \left\{ \frac{-1}{2}, \frac{-3}{4} \right\}$
 (C) $x \in \left\{ \frac{-1}{2}, 1 \right\}$ (D) $x \in \left\{ 0, \frac{-3}{4} \right\}$

5. Find the value for " x ", so that the three points, $\{(2, 7), (6, 1), (x, 0)\}$ are collinear.

- (A) 7 (B) $4\frac{1}{2}$ (C) 10 (D) $6\frac{2}{3}$

6. Consider the sequence $1, -2, 3, -4, 5, -6, \dots, n, (-1)^{n+1}$.
 What is the average of the first 300 terms of the sequence?

- (A) -1 (B) 0.5 (C) 0 (D) -0.5

7. Let " b " be a positive number such that the system

$$\begin{cases} ax + 3y = 1 \\ 5x + ay = b \end{cases}$$

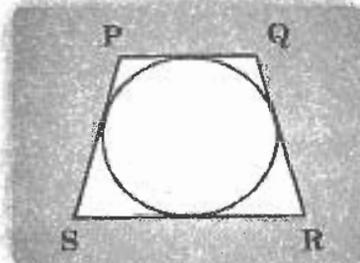
has an infinite number of solutions. By rounding to the nearest hundredth, the value of " b " equals _____

- (A) 0.60 (B) 1.29 (C) 1.67 (D) 3.87

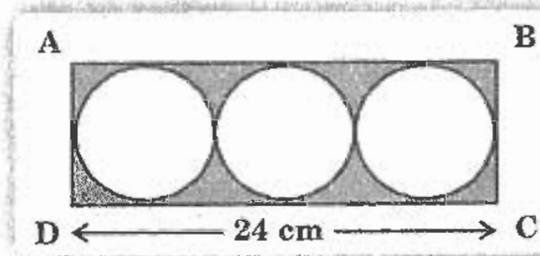
8. If the first four terms of an arithmetic sequence are: $a, 2a, b$ and $a - 6 - b$ for some numbers " a " and " b ", then the value of the 100th term is:

- (A) -100 (B) -300
 (C) 150 (D) -150

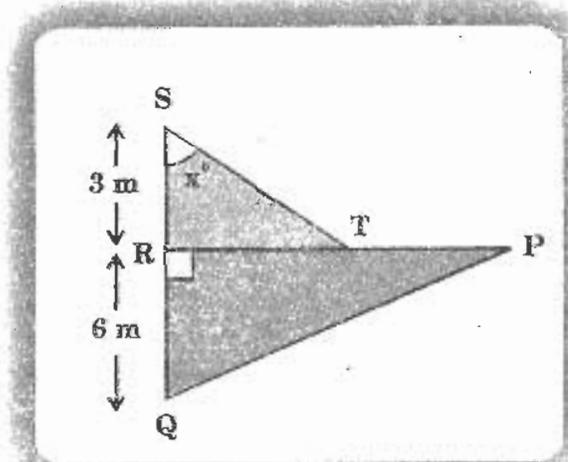
9. A circle is inscribed in trapezoid PQRS. If $PS = QR = 25$ cm, $PQ = 18$ cm and $SR = 32$ cm, what is the length of the diameter of the circle?



- (A) 14 cm (B) 25 cm (C) 24 cm (D) $\sqrt{674}$ cm
10. In the diagram, ABCD is a rectangle, and three circles are positioned as shown. The area of the shaded region, rounded to the nearest cm^2 , is:



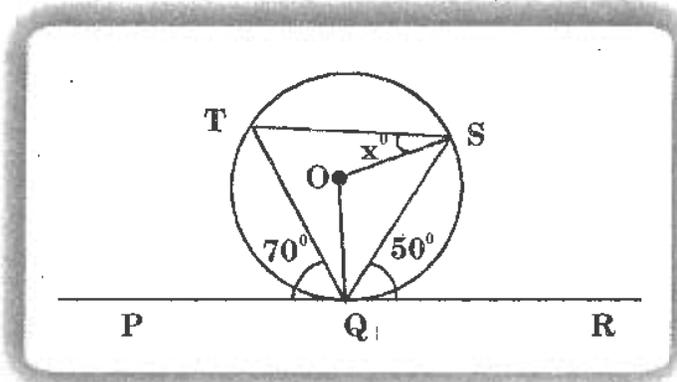
- (A) 41 (B) 43 (C) 45 (D) 47
11. In the diagram, PTR and QRS are straight lines.



Given that, $\tan x^\circ = \frac{4}{3}$ and "T" is the midpoint of PR, calculate the length of PQ, in cm.

- (A) $\sqrt{8}$ (B) 9 (C) $\sqrt{59}$ (D) 10

12.



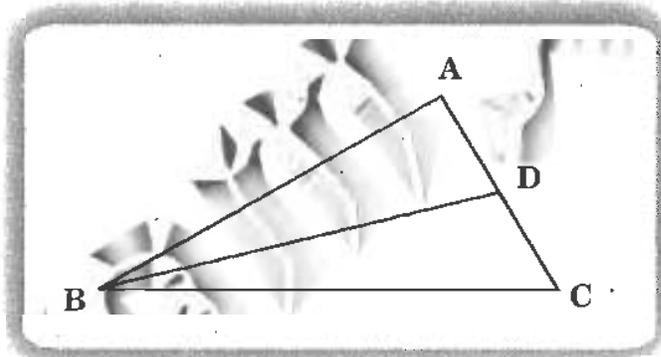
In the diagram, PQR is a tangent to the circle at Q and "O" is the centre of the circle. Find the value of "x".

- (A) 25° (B) 30° (C) 35° (D) 40°

13. Use the proof to answer the question below.

Given : $\overline{AB} \cong \overline{BC}$; D is the midpoint of \overline{AC}

Prove: $\triangle ABD \cong \triangle CBD$



Statement

Reason

1. $\overline{AB} \cong \overline{BC}$; D is the midpoint of \overline{AC}

1. Given

2. $\overline{AD} \cong \overline{CD}$

2. Definition of midpoint

3. $\overline{BD} \cong \overline{BD}$

3. Reflexive property

4. $\triangle ABD \cong \triangle CBD$

4. ?

What reason can be used to prove that the triangles are congruent?

- (A) AAS (B) ASA (C) SAS (D) SSS

14. An irrational number is:

- (A) a terminating and non-repeating decimal
 (B) a non-terminating and non repeating decimal
 (C) a terminating and repeating decimal
 (D) a non-terminating and repeating decimal

15. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, then $\cos\theta - \sin\theta =$ _____

- (A) $\sqrt{2}\tan\theta$ (B) $\sqrt{2}\sin\theta$ (C) $\frac{\sqrt{2}}{\cos\theta + \sin\theta}$ (D) None of these

16. If α, β and γ are the zeroes of the cubic polynomial $3x^3 - 5x^2 - 11x - 3$, then $\alpha + \beta + \gamma =$ _____

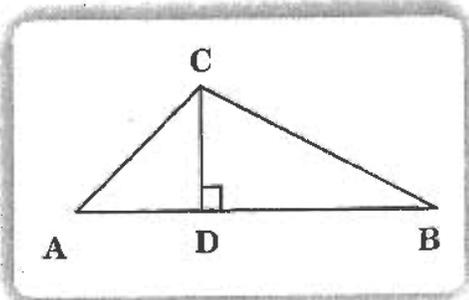
- (A) $\frac{5}{3}$ (B) $-\frac{11}{3}$ (C) 1 (D) $-\frac{5}{3}$

17. Find the remainder when $5^{2009} + 13^{2009}$ is divided by 18.

- (A) 0 (B) 1 (C) 2 (D) None of these

18. In the given figure, $\angle ACB = 90^\circ$ and $CD \perp AB$. Then

$$\frac{BC^2}{AC^2} =$$

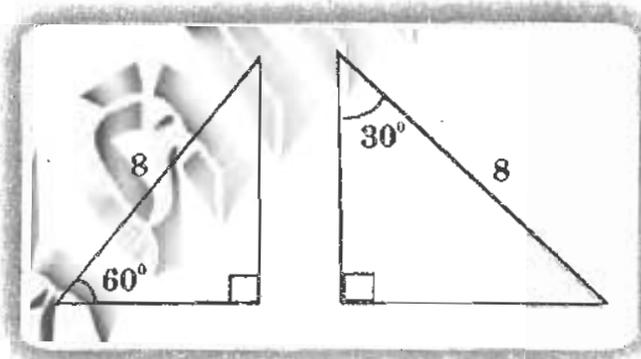


- (A) $\frac{BD}{CD}$ (B) $\frac{CD}{AD}$ (C) $\frac{BD}{AD}$ (D) $\frac{BC}{CD}$

19. By solving $\frac{5}{x+y} - \frac{2}{x-y} = -1$ and $\frac{15}{x+y} - \frac{7}{x-y} = 10$, we get:

- (A) $x = \frac{19}{351}; y = \frac{-46}{351}$ (B) $x = \frac{-19}{351}; y = \frac{46}{351}$
 (C) $x = \frac{-46}{351}; y = \frac{-19}{351}$ (D) $x = \frac{-46}{351}; y = \frac{19}{351}$

20. Number of common tangents that can be drawn to two concentric circles is:
- (A) 0 (B) 1 (C) 3 (D) 4
21. The tops of two poles of heights 20 m and 14 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then the length of the wire is:
- (A) 40 m (B) 12 m (C) 28 m (D) 68 m
22. If $2009 = p^a \cdot q^b$, where "p" and "q" are prime numbers, then find the value of $p + q$.
- (A) 3 (B) 48 (C) 51 (D) 2009
23. The length of shadow of a tower is $\sqrt{3}$ times that of its length. The angle of elevation of the sun is:
- (A) 45° (B) 30° (C) 60° (D) 90°
24. The degree of the polynomial $6a^4 - a^3 + ab^3 + b^4$ is:
- (A) 4 (B) 3 (C) 7 (D) 8
25. Which of the following best describes the triangles shown below?



- (A) Both are similar and congruent
- (B) Both are similar but not congruent
- (C) Both are congruent but not similar
- (D) Both are neither similar nor congruent

26. You can burn a piece of paper using the reflected rays of the Sun by using:
- (A) a plane mirror
 - (B) a concave mirror
 - (C) a convex mirror
 - (D) none of these
27. The resistance of a conducting wire doesn't depend upon:
- (A) area of cross section
 - (B) length
 - (C) temperature
 - (D) voltage applied
28. Which of the following equipment works on the principle of electromagnetic induction?
- (A) Electric fan
 - (B) MP3 player
 - (C) Generator
 - (D) Refrigerator
29. Fission of a nucleus is achieved by bombarding it with:
- (A) protons
 - (B) neutrons
 - (C) electrons
 - (D) x-rays
30. If the refractive index of diamond is 2.42, then the speed of light when passing through diamond _____
- (A) increases by 41%
 - (B) decreases by 41%
 - (C) increases by 59%
 - (D) decreases by 59%
31. Fusion reaction takes place at a high temperature because:
- (A) atoms are ionised at high temperatures
 - (B) molecules breakup at high temperatures
 - (C) nuclei breakup at high temperature
 - (D) kinetic energy is high enough to overcome the repulsion between the nuclei

32. The glass bulb of an electric bulb is sealed to:

- (A) protect the filament from oxidation
- (B) maintain temperature inside
- (C) prevent effects of humidity
- (D) all of the above



33. Which of the following statements is NOT true?

- (A) The magnetic field produced by a given current in the conductor decreases as the distance from it increases
- (B) The pattern of the magnetic field lines around a current carrying solenoid is different than that of a bar magnet
- (C) Maxwell's cork screw rule gives the direction of the magnetic field
- (D) A solenoid is used to produce an electromagnet

34. A long sighted person has a minimum distance of distinct vision of 50 cm. He wants to reduce it to 25 cm. He should use a:

- (A) concave lens of focal length 25 cm
- (B) concave lens of focal length 50 cm
- (C) convex lens of focal length 25 cm
- (D) convex lens of focal length 50 cm

35. A sharp, bright spot is observed at the focus when a convex lens is placed under sun rays. This spot is the:

- (A) real image of the Sun
- (B) virtual image of the Sun
- (C) optical illusion produced by the convex lens
- (D) magnified image of the Sun

36. An electric bulb is rated 220 V, 100 watt. The power consumed by it when operated on 110 volt will be:

- (A) 25 watt (B) 50 watt (C) 75 watt (D) 40 watt

37. A coil and a magnet are moved in the same direction and with same speed. What will happen?

- (A) The coil will experience a force
- (B) The magnet will experience a force
- (C) Electric current will be induced in the coil
- (D) Electric current will not be induced in the coil

38. A convex lens of power 4D is placed at a distance of 40 cm from a wall. At what distance from the lens should a candle be placed so that its image is formed on the wall?

- (A) $\frac{100}{3}$ cm
- (B) $\frac{200}{3}$ cm
- (C) $\frac{400}{3}$ cm
- (D) $\frac{800}{3}$ cm

39. Consider the following statements.

P: In a series connection, same current flows through each element of the circuit.

Q: In a parallel connection, same potential difference gets applied across each element.

- (A) Both P and Q are correct
- (B) P is correct but Q is wrong
- (C) P is wrong but Q is correct
- (D) Both P and Q are wrong

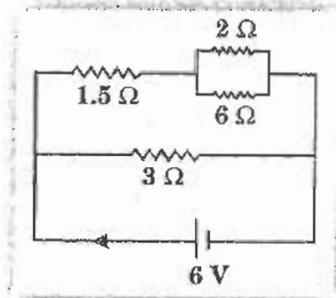
40. Ravindran got an electric shock when he touched the heating coil of an electric heater, although the switch was in 'off' position. What could have been the reason?

- (A) Excess current was flowing in the circuit
- (B) The switch was connected to the live wire
- (C) The switch was connected to the neutral wire
- (D) The fuse of the house had blown off

41. Which of the following statements is NOT correct?

- (A) A medium with larger refractive index is optically denser as compared to a medium with smaller refractive index
- (B) The speed of light is less in a rarer medium than a denser medium
- (C) Refraction is due to the change in speed of light as it enters from one transparent medium to another
- (D) The absolute refractive index of a medium is simply called its refractive index

42. What will be the current supplied by the battery in the circuit shown here?



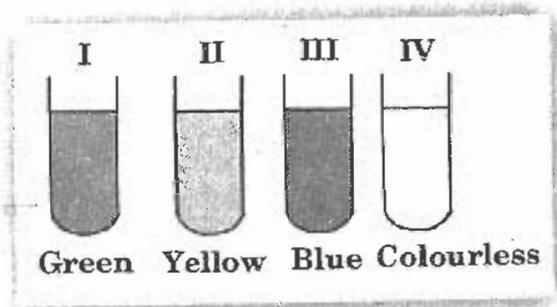
- (A) 1 A (B) 2 A (C) 3 A (D) 4 A
43. The difference between an A.C. and a D.C. generator is:
- (A) an A.C. generator has slip rings and a D.C. generator has commutator
- (B) an A.C. generator has commutator and a D.C. generator has slip rings
- (C) A.C. generator rotates only in one direction
- (D) the polarity of the current changes every half rotation in a D.C. generator
44. A plano-convex lens of refractive index 1.5 and radius of curvature 30 cm is silvered at the curved surface. This lens is used to form the image of an object. At what distance from the lens an object be placed in order to have a real image of the size of the object?
- (A) 20 cm (B) 30 cm (C) 60 cm (D) 80 cm
45. In a domestic electric supply the earthpin of a plug is made thicker because:
- (A) more current flows into it
- (B) it can provide easy flow path to current
- (C) it can help in proper electrical connection
- (D) all of the above

CLASS : X

CHEMISTRY

51. Which of the following is a transition element?
(A) Pb (B) As (C) Al (D) Ni
52. Which of the following statements about graphite and diamond is true?
(A) They have the same crystal lattice structure
(B) They have the same degree of hardness
(C) They have the same electrical conductivity
(D) They can undergo the same chemical reactions
53. Smelting is done in:
(A) electric furnace (B) muffle furnace
(C) blast furnace (D) open-hearth furnace
54. Available chlorine is formed when bleaching powder reacts with:
(A) dilute acid (B) dilute base (C) nascent oxygen (D) chlorine
55. Which of these is NOT balanced correctly?
(A) $\text{Mg} + \text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2 + \text{H}_2$
(B) $2\text{AlCl}_3 + 3\text{Ca}(\text{OH})_2 \rightarrow 2\text{Al}(\text{OH})_3 + 3\text{CaCl}_2$
(C) $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
(D) $2\text{Al} + 3\text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + 3\text{H}_2$
56. Assertion : According to mendeleef, periodic properties of elements is a function of their atomic masses.
Reason: Atomic number is equal to the number of protons.
(A) Both assertion and reason are true and reason is the correct explanation of assertion.
(B) Both assertion and reason are true but reason is not the correct explanation of assertion.
(C) Assertion is true and reason is false
(D) Both assertion and reason are false
57. The difference in formula and molecular masses for CH_3OH and $\text{C}_2\text{H}_5\text{OH}$ is:
(A) CH_3 and 16 units (B) CH_2 and 14 units
(C) CH_4 and 18 units (D) CH_3 and 16 units

58. The metal which is more hard and corrosion resistant is:
 (A) nickel (B) iron (C) platinum (D) tungsten
59. Four test tubes containing solution (I), (II), (III) and (IV) are shown below along with their colours. Zinc sulphate is contained in:

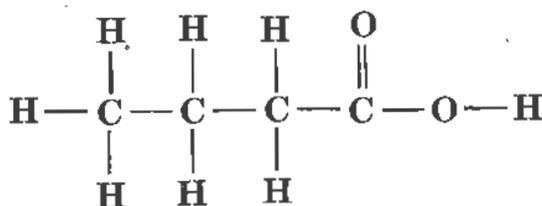


- (A) I only (B) II only (C) III only (D) IV only
60. Which of the statements about the reaction,
 $\text{ZnO} + \text{CO} \rightarrow \text{Zn} + \text{CO}_2$, is correct?
 (A) ZnO is being oxidised (B) CO is being reduced
 (C) CO_2 is being oxidised (D) ZnO is being reduced
61. Match the following.

1. Dobereiner	a. Study of atomic volume
2. Lotharmeyer	b. Atomic number
3. Newlands	c. Periodic table
4. Moseley	d. Triad law
5. Mendeleev	e. Octaves rule

- (A) 1 - d, 2 - c, 3 - b, 4 - a, 5 - e (B) 1 - d, 2 - a, 3 - e, 4 - b, 5 - c
 (C) 1 - a, 2 - d, 3 - e, 4 - b, 5 - c (D) 1 - d, 2 - a, 3 - c, 4 - b, 5 - c

62. IUPAC name of the following structure is:



- (A) pentanone (B) butyric acid
 (C) butanoic acid (D) butanone

63. Gun metal contains:

- (A) Cu 60%, Sn 40% (B) Cu 80%, Sn 20%
 (C) Cu 70%, Sn 30% (D) Cu 90%, Sn 10%

64. The ionic part of synthetic detergent is:

- (A) $-\text{OSO}_3^- \text{Na}^+$ (B) $-\text{COO}^- \text{Na}^+$
 (C) $-\text{COO}^- \text{H}^+$ (D) $-\text{COO}^- \text{CH}_3^+$

65. Which of the following is a redox reaction?

- (A) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ (B) $\text{H}_2 + \text{CuO} \rightarrow \text{Cu} + \text{H}_2\text{O}$
 (C) $\text{CaO} + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O}$
 (D) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

66. Locate each of the following elements on the periodic table.

p. Most electronegative element

q. Group IVA element with the largest atomic radius

r. Group VIA element with the smallest atomic radius

s. Group IIIA element that is a semiconductor

t. Group VA element that forms the strongest π bonds

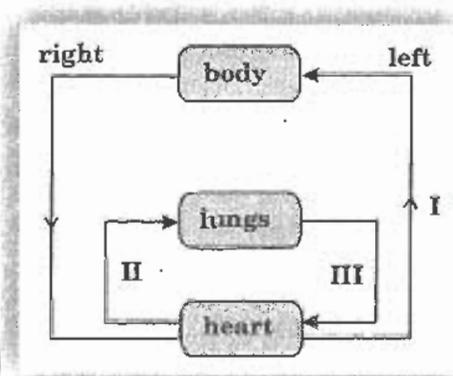
(A)

(B)

71. As food passes along the alimentary canal, proteins are digested in the:
- (A) mouth, stomach and duodenum
 (B) stomach, duodenum and ileum
 (C) stomach, pancreas and caecum
 (D) duodenum, ileum and liver
72. Figure given here shows the blood circulatory system in the human body.

Which of the paths I, II and III contain oxygenated blood?

- (A) I and II only
 (B) II and III only
 (C) I and III only
 (D) I, II and III



73. Farmers crossed two breeds of cattle, the Jersey from Europe and the Sahiwal from Africa. For many generations, the farmers picked out the offspring with the highest milk yields to breed the next generation.

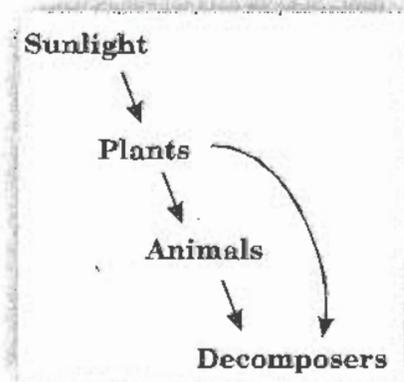
Which phrase best describes this process?

- (A) Evolution (B) Natural selection
 (C) Artificial selection (D) Discontinuous variation

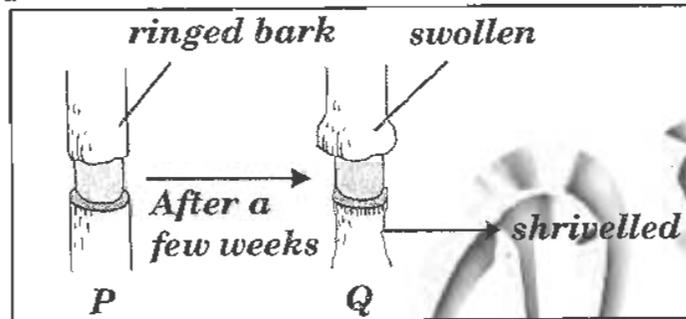
74. The diagram shows a simple version of the energy flow through a food web.

What happens to the energy leaving the decomposers?

- (A) It is lost as heat
 (B) It is reflected from the surface of the plants
 (C) It is stored as carbohydrates
 (D) It is used to power industrial processes



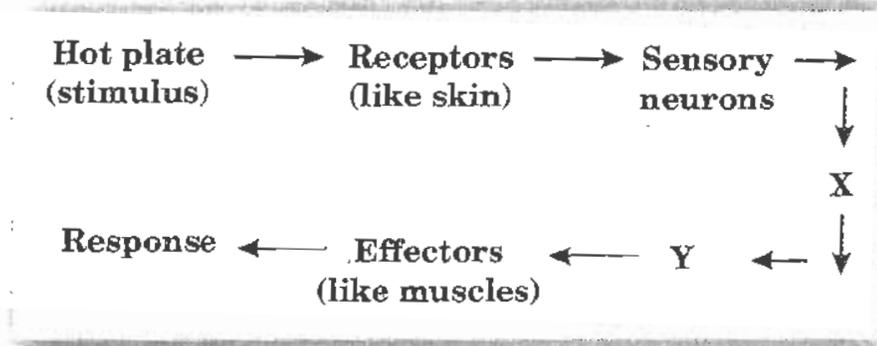
75. In peas, the allele 'S', for smooth seeds, is dominant over 's' for wrinkled seeds. 200 heterozygous plants were self-pollinated and 1500 smooth seeds were collected. How many wrinkled seeds were collected?
- (A) 6000 (B) 2000 (C) 1500 (D) 500
76. Figure given below (P) shows the bark of a woody plant that has been cut off.



After several weeks, the part above the ring has swollen and the part below the bark has shrivelled as shown in figure (Q). This is because:

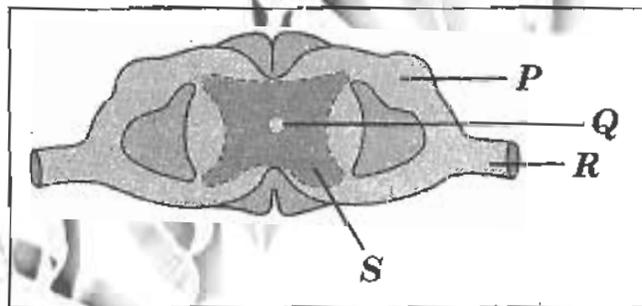
- | | |
|-----|---|
| I | the food below the ring has been used up |
| II | food cannot be transported to the part below the ring |
| III | water and mineral salts cannot be transported |

- (A) I and II only (B) II and III only
 (C) I and III only (D) I, II and III
77. What is a National Park?
- (A) An area strictly reserved for improvement of wild life
 (B) An area where grazing and cultivation are permitted
 (C) A park where the whole nation can have picnics
 (D) A park which can be privately owned
78. The reflex arc pathway is shown in the flow chart given below.
- What could be X and Y?



	X	Y
(A)	Brain	Sensory neurons
(B)	Spinal cord	Motor neurons
(C)	Brain	Motor neurons
(D)	Inter neuron	Spinal cord

79. The diagram given below shows the transverse section through part of the spinal cord. Which labelled region contains the cell bodies of motor neurons?

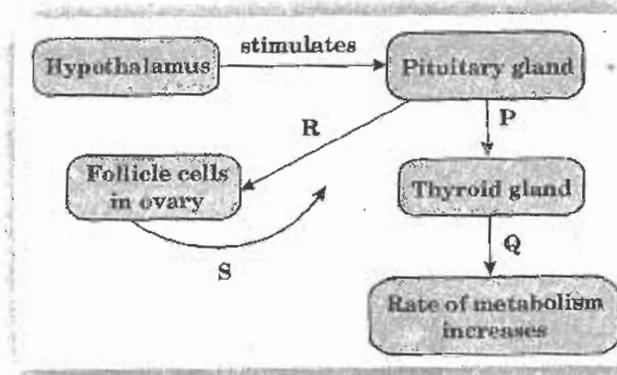


- (A) P (B) Q (C) R (D) S

80. In photosynthesis, light energy is utilized in:

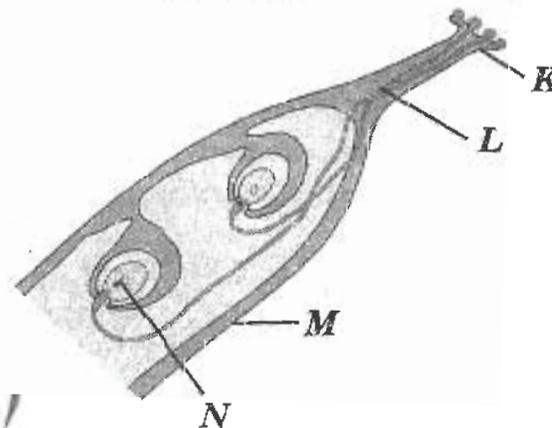
- (A) converting CO₂ into carbohydrate
- (B) converting ATP into ADP
- (C) converting carbohydrate into oxygen
- (D) converting ADP to ATP

81. Figure below shows negative feedback mechanism in regulating the secretion of hormones by specific endocrine glands. What are hormones P, Q, R and S?



	P	Q	R	S
(A)	FSH	Thyroxine	TSH	Progesterone
(B)	TSH	Thyroxine	FSH	Estrogen
(C)	Thyroxine	FSH	TSH	Progesterone
(D)	Estrogen	TSH	FSH	Thyroxine

82.



What is the function of the structure labelled L in the above given diagram?

- (A) To provide food to the zygote
- (B) To allow pollen grains to move to the ovules
- (C) To allow male reproductive cells to move to the ovules
- (D) To provide a place for the fertilisation of male and female gametes

83. In the following question, a statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of the statements, mark the correct answer.

Assertion (A): Head of the sperm consists of acrosome and mitochondria

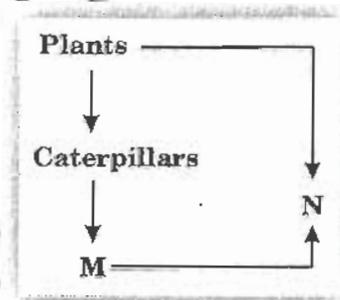
Reason (R): Acrosome contains spiral row of mitochondria.

- (A) If both A and R are true and R is the correct explanation of A
- (B) If both A and R are true and R is not the correct explanation of A
- (C) If A is true but R is false
- (D) If both A and R are false

84. Figure given below shows a food web.

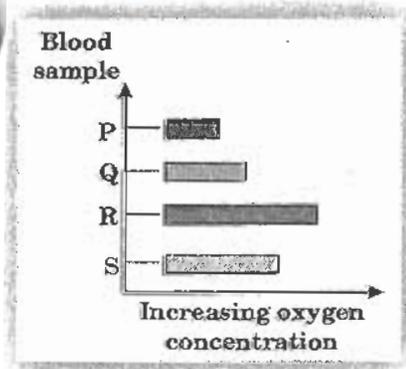
The organisms labelled M and N are:

- (A) M - primary consumer, N - tertiary consumer
- (B) M - tertiary consumer, N - producer
- (C) M - decomposer, N - secondary consumer
- (D) M - secondary consumer, N - primary consumer



85. The bar chart shows the concentration of oxygen in blood samples taken from four different places in the circulatory system of a mammal.

Which sample was taken from a pulmonary vein?



- (A) P
- (B) Q
- (C) R
- (D) S

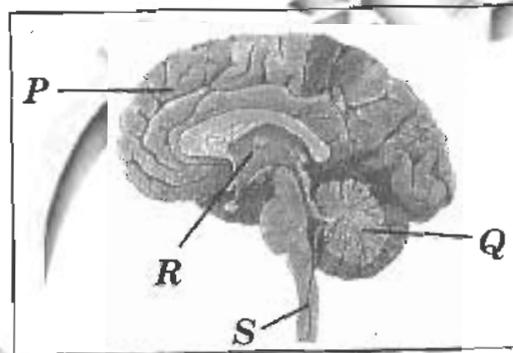
86. **Process of embryo formation without fertilization is:**

- (A) apogamy (B) parthenogenesis
(C) polyembryony (D) apospory

87. **Variation is important because:**

- (A) it enables organisms to adapt to the changing environment
(B) it prevents the extinction of species
(C) it results in the formation of new species
(D) all of the above

88. **The figure given below shows the structure of human brain. Which of these labelled parts control blood sugar level, osmoregulation and thermoregulation?**



- (A) S (B) R
(C) Q (D) P

89. **Human arm is homologous with:**

- (A) an octopus tentacle (B) a bird wing
(C) a seal flipper (D) both B and C

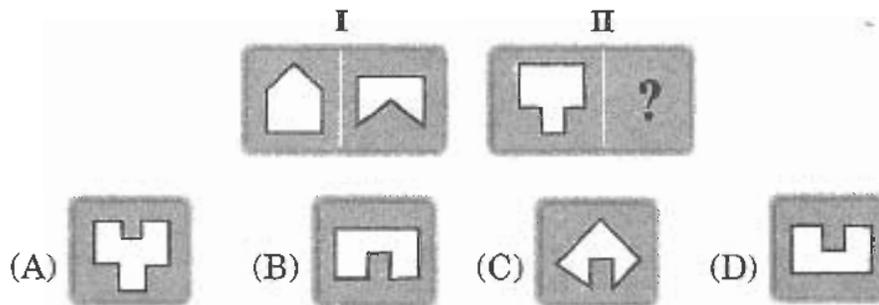
90. **The figure given below is a part of functional unit of the kidney. Which of the following processes occur in this part?**



- (A) Tubular secretion (B) Tubular reabsorption
(C) Ultrafiltration (D) All of the above

CLASS : X GENERAL QUESTIONS

91. Study the relation between the figures in Set I and find the missing figure in Set II?



92. 'HOT' is related to 'OVEN' in the same way 'COLD' is related to:
 (A) ICE CREAM (B) REFRIGERATOR
 (C) AIRCONDITIONER (D) SNOW
93. A quarter of a bag of potatoes weighs 16 kg. How much does the bag weigh?
 (A) 16 (B) 18 (C) 80 (D) 64
94. Which is the second major city of Ladakh which has become internationally famous because of Pakistani aggression?
 (A) Leh (B) Lahsa
 (C) Mublek (D) Kargil
95. Which of these countries will be hosting the Asian Games for the third time in 2014?
 (A) South Korea (B) Japan
 (C) China (D) Bangladesh
96. By which treaty Clive secured the diwani of Bengal, Bihar and Orissa?
 (A) Treaty of Plassey (B) Treaty of Allahabad
 (C) Treaty of Bengal (D) None of these

97. Expand URL, the technical name for a website address.
- (A) Upper Resource Locator
 - (B) Uniform Resource Locator
 - (C) Uniform Reliable Locator
 - (D) Under Resource Locator
98. Malta lies in which sea?
- (A) Arabian sea
 - (B) Bay of Bengal
 - (C) Hudson Bay
 - (D) Mediterranean sea
99. Who among the following is the current secretary-general of SAARC?
- (A) Yadav Kant Silwal
 - (B) Abul Ahsan
 - (C) Sheel Kant Sharma
 - (D) L.C. Dorji
100. 'Maoris' are the inhabitants of:
- (A) New Zealand
 - (B) Hungary
 - (C) North America
 - (D) Japan

KEY FOR THE Q.P.-2009

1. A	2. D	3. C	4. C	5. D	6. D	7. B	8. A
9. C	10. A	11. D	12. B	13. D	14. B	15. B	16. A
17. A	18. C	19. C	20. A	21. B	22. B	23. B	24. C
25. A	26. B	27. D	28. C	29. B	30. D	31. D	32. D
33. B	34. D	35. A	36. A	37. D	38. B	39. A	40. C
41. B	42. D	43. A	44. A	45. C	46. A	47. D	48. D
49. C	50. A	51. D	52. D	53. C	54. A	55. A	56. B
57. B	58. D	59. D	60. D	61. B	62. C	63. D	64. A
65. B	66. B	67. B	68. B	69. C	70. C	71. B	72. C
73. C	74. A	75. D	76. A	77. A	78. B	79. D	80. D
81. B	82. C	83. D	84. D	85. C	86. B	87. D	88. B
89. D	90. C	91. D	92. B	93. D	94. D	95. A	96. B
97. B	98. D	99. C	100. A				