SCIENCE OLYMPIAD FOUNDATION

SAMPLE PAPER

DPS Science & Maths TALENT EXAMINATION 2013-14

Time : 2 hrs. | **Guidelines for the Candidate** | Total Marks : 100

1. The paper consists of four sections –
   Physics (20 Questions), Chemistry (20 Questions), Biology (20 Questions) and Mathematics (40 Questions)
2. All questions are compulsory and carry equal marks. There is no negative marking. Use of calculator is not permitted.
3. Write your Name, School Name and Roll No. clearly on the Answer sheet and do not forget to sign.
4. There is only one correct answer hence mark one choice only.
5. Answer sheet is given on the last page. Darken your choice with **HB Pencil** or **Blue / Black Ball Point Pen** only.
   For Example :

   Q.16 : In the water cycle, condensation is the process of
   (A) Water vapour cooling down and turning into a liquid
   (B) Ice warming up and turning into a liquid
   (C) Liquid cooling down and turning into ice
   (D) Liquid warming up and turning into water vapour

   16. ● Ⓑ Ⓒ Ⓓ

   As the correct answer is option No. (A), the candidate should darken the circle corresponding to option No. (A)
6. Rough work should be done in the blank space provided in the booklet.

SYLLABUS

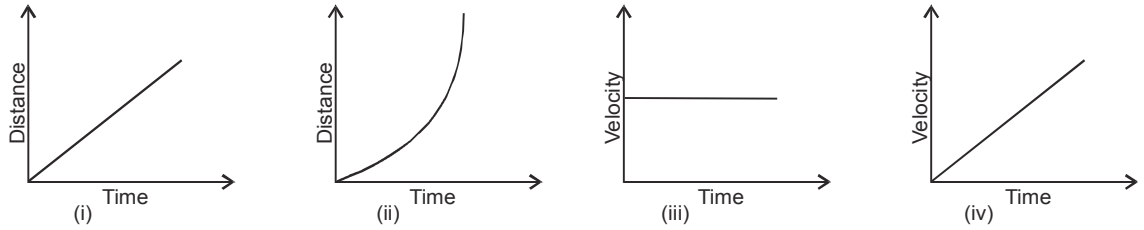
Science : Motion, Force and Laws of Motion, Gravitation, Work and Energy, Sound, Matter, Atoms and Molecules, Structure of the Atom, Cell & Tissue, Diversity in Living Organisms, Ecology, Biology in Human Welfare, Health & Disease.

Mathematics : Mathematical Operations, Series Completion, Arithmetical Reasoning, Problems on Cubes and Dice, Number Ranking & Time Sequence Test, Inserting Missing Character and General Reasoning based on Prescribed Syllabus.

Number System, Polynomials, Ratio and Proportions, Co-ordinate Geometry, Linear Equation in Two Variables, Percentage and its Applications, Compound Interest, Lines and Angles, Triangles, Circles, Quadrilaterals, Area of Parallelograms and Triangles, Mensuration of Plane and Solid Figures, Statistics, Probability, Heron's Formula.

PHYSICS

1. Which of the following graphs represent uniform motion?



(A) (i) and (ii) **(B)** (i) and (iv) **(C)** (iii) and (ii) **(D)** (i) and (iii)

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2. A stone is tied to one end of a string, and is rotated in a horizontal circle whose centre lies at the other fixed end of the string. If the stone is released during its motion by letting the fixed end free. The path described by the stone is

(A) Along a straight line towards the centre of the circle
(B) Along a straight line (radially) away from the centre of the circle
(C) Along a straight line tangential to the circular path
(D) It doesn't change its path.

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3. A jet engine works on the principle of

(A) Conservation of linear momentum **(B)** Conservation of kinetic energy
(C) Conservation of angular momentum **(D)** Conservation of inertia.

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4. In an isolated system

(A) Some external force acts on the system
(B) Velocity of the particles of the system doesn't change
(C) Total momentum remains conserved **(D)** All of these.

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5. A spaceship brings a rock of mass to the earth. On the surface of earth

(A) Mass of rock changes but not the weight **(B)** Weight of rock changes but not the mass
(C) Mass and weight of the rock remain same **(D)** Both mass and weight of the rock change.

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6. A ball thrown up vertically returns to the thrower after 6 seconds. The velocity with which it was thrown is

(A) 30 m/s **(B)** $30\sqrt{2}$ m/s **(C)** $-\frac{27}{4}$ m/s **(D)** 30 × 2 m/s

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7. A cricket ball weighing 100 g and moving with a speed of 20 m s^{-1} strikes a bat and remains in contact with it for 0.1 s. The average force exerted by the ball on the bat is

(A) 100 N **(B)** 40 N **(C)** 20 N **(D)** 1 N

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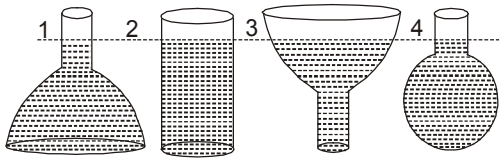
8. A liquid is taken in different shaped vessels as shown in the figure.



The vessels are filled with the liquid up to same level. We know that
(i) Pressure is inversely proportional to the area on which force acts.
(ii) Pressure depends on the depth of liquid column.
Which vessel will have the highest pressure at the bottom?

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4

9. Match the items of Column A with the corresponding items of Column B.

Column A	Column B
1. Sound waves of frequency less than 20 Hz	**(a) 20 Hz to 20,000 Hz**
2. Audible range of frequency	**(b) Wavelength**
3. Distance between two successive compressions	**(c) About 340 m s^{-1}**
4. Speed of sound waves in air	**(d) infrasonic waves**

(A) 1-(d); 2-(a); 3-(b); 4-(c) **(B)** 1-(b); 2-(c); 3-(d); 4-(a)
(C) 1-(a); 2-(b); 3-(c); 4-(d) **(D)** 1-(c); 2-(d); 3-(a); 4-(b)

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10. Which of the following statement is not true regarding circular motion?
(A) The body moves with a uniform speed. **(B)** The body moves with a variable velocity.
(C) The body has a uniform acceleration. **(D)** The body has a uniform velocity.

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11. An iron ball and a glass ball of same size are immersed in water. Which of the following statement is correct?
(A) The weight loss in iron ball is more. **(B)** The weight loss in glass ball is more.
(C) The buoyant force on iron ball is more. **(D)** The buoyant force is same on both the balls.

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12. Choose the correct statement.
(A) A low pitch sound has high frequency. **(B)** A high pitch sound has high frequency.
(C) Soft sound has large amplitude. **(D)** Louder sound has small amplitude.

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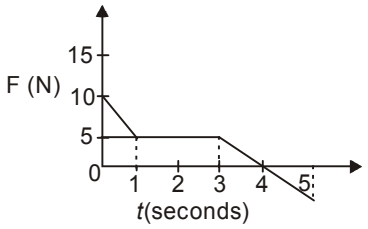
13. In the given graph the work done during the first 5 second is

(A) 10 J

(B) 12.5 J

(C) 15 J

(D) 17.5 J



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14. The velocity of a particle increases from *u* to *v* in a time *t* during which it covers a distance *S*. If the particle has a uniform acceleration *a*, which one of the following equation does not apply to the motion?

(A) $2S = (v + u)t$ **(B)** $a = \frac{v - u}{t}$ **(C)** $v^2 = u^2 - 2aS$ **(D)** $S = \left(u + \frac{1}{2}at\right)t$

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15. Which type of energy conversion taking place when a compressed spring is released?
(A) Molecular energy to potential energy. **(B)** Kinetic energy to potential energy.
(C) Potential energy to kinetic energy. **(D)** Potential energy to molecular energy.

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16. A body thrown vertically up, at the maximum height
(A) The velocity is not zero but acceleration is zero **(B)** The acceleration is not zero but velocity is zero
(C) Both acceleration and velocity are zero **(D)** Both acceleration and velocity are not zero.

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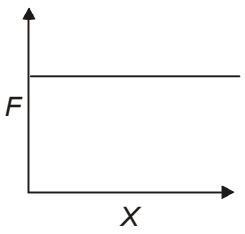
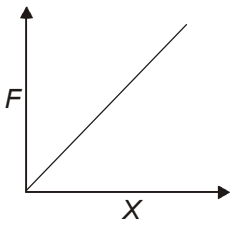
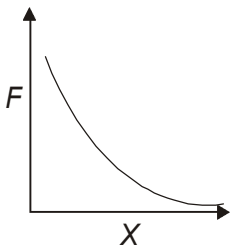
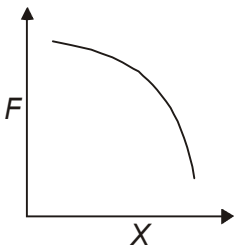
17. If '*X*' represent the product of the masses of two bodies and *F* be the force of attraction between the two bodies, then *F* varies with *X* as

(A)


(B)


(C)


(D)


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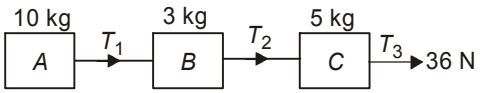
18. Pressure at a point inside a liquid does not depends on
(A) The depth of the point below the surface of the liquid **(B)** The nature of the liquid
(C) The acceleration due to gravity at that point **(D)** The shape of the containing vessel.

19. Three blocks *A, B* and *C* of masses 10 kg, 3 kg, and 5 kg respectively are connected by a light inextensible smooth horizontal plane. If a force of 36 N is applied to the string connected to *C*.



The ratio of T_2 and T_1 is

(A) 10 : 13 **(B)** 10 : 2 **(C)** 13 : 10 **(D)** 1 : 5

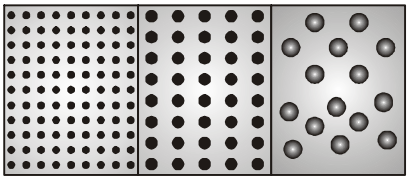
20. A sharp knife can cut food much more easily because

(A) It produces a greater pressure on the food
(B) Friction between the blade and the food is reduced
(C) It produces a greater force than a blunt knife
(D) Its mass is less as the blade is thinner.

CHEMISTRY

21. Types of solutions in boxes P, Q and R respectively are _____.

	P	Q	R
(A)	Suspension	Colloidal	Solution
(B)	Solution	Colloidal	Suspension
(C)	Solution	Suspension	Colloidal
(D)	Suspension	Solution	Colloidal



22. Match both the columns and select the correct option from the codes given below.

	Column I		Column II
(a)	**Mercury**	**(i)**	**Acidic oxide**
(b)	**CO_2**	**(ii)**	**Liquid metal**
(c)	**Gold**	**(iii)**	**Basic oxide**
(d)	**MgO**	**(iv)**	**Malleable**

(A) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv) **(B)** (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)
(C) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i) **(D)** (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)

23. Consider the following statements :
Assertion (A) : Gun powder is an example of mixture.
Reason (R) : The components of gun powder are not present in a fixed ratio.
Of these statements :

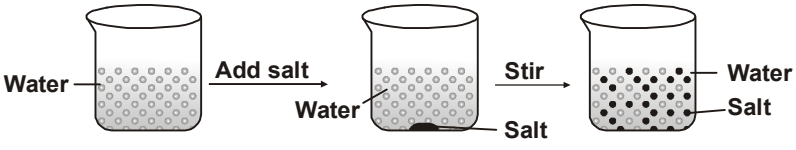
(A) Both A and R are true and R is the correct explanation of A
(B) Both A and R are true but R is not the correct explanation of A
(C) A is true but R is false
(D) A is false but R is true.

24. Favourable conditions for evaporation are _____.

I. Increase in surface area **II. Increase in temperature**
III. Increase in humidity **IV. Increase in wind speed**

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

25.



The conclusion we can draw from the above experiment is that _____.

(A) nature of matter is continuous
(B) matter is made up of particles
(C) particles of salt get into the spaces between the particles of water
(D) both (B) and (C)

26. If 2.5 g of a solute is dissolved in 25 g of water to form a saturated solution at 298 K, the solubility of the solute is _____

(A) 0.1 **(B)** 10 **(C)** 100 **(D)** 50

27. Choose the correct comparison between solution and suspension.

	Solution		Suspension	
(A)	Homogeneous	separated by filtration	non-homogeneous	not separated by filtration
(B)	Homogeneous	not separated by filtration	non-homogeneous	separated by filtration
(C)	Non-homogeneous	separated by filtration	homogeneous	not separated by filtration
(D)	Non-homogeneous	not separated by filtration	homogeneous	separated by filtration

28. Neha sets up an experiment as shown in the figure.

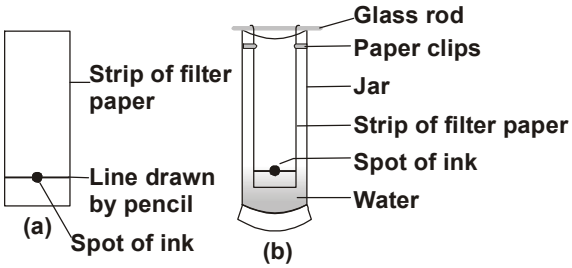
She is trying to _____.

(A) check the solubility of ink in water

(B) find out the number of components of ink

(C) observe the effect of gravity on the process

(D) observe absorption of ink on paper



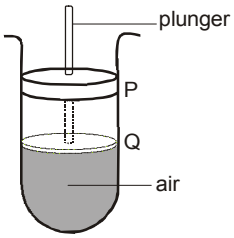
29. In the diagram, air is compressed when the plunger moves from P to Q. This is because air

(A) is highly compressible

(B) has particles which are constantly moving

(C) has particles which have intermolecular forces

(D) has particles of negligible mass.



30. The option showing the correct relative mass and relative charge of a proton, neutron and electron respectively is

	Proton		Neutron		Electron	
	relative mass	relative charge	relative mass	relative charge	relative mass	relative charge
(A)	1	+1	1	0	very small	–1
(B)	0	+1	0	0	1	0
(C)	1	0	1	0	1	0
(D)	1	+1	0	0	very small	–1

31. What weight of oxygen gas will contain the same number of molecules as 56 g of nitrogen gas?

(A) 64 g **(B)** 32 g **(C)** 56 g **(D)** 28 g

32. Match both the columns and select the correct option from the codes given below.

Column I (Fuel)	Column II
(a) LPG	**(i) Paints**
(b) Bitumen	**(ii) Ointments**
(c) Paraffin wax	**(iii) Aviation fuel**
(d) Petrol	**(iv) Fuel for home**

(A) (a) - (i), (b) - (iii), (c) - (iv), (d) - (ii) **(B)** (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)

(C) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii) **(D)** (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii).

33. Statement I : Number of molecules of water in 18 u of water is same as the number of molecules of SO_2 in 64 u of SO_2.

Statement II : Number of molecules of water in 18 g of it is same as the number of molecules of SO_2 in 18 g of SO_2.

(A) Both statements I and II are true and statement II is the correct explanation of statement I.

(B) Both statements I and II are true but statement II is not the correct explanation of statement I.

(C) Statement I is true but statement II is false.

(D) Statement I is false but statement II is true.

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34. Concentration of a solution, in mass by volume percentage, when 36 g of sodium chloride is dissolved in water to form 145 mL of solution is _____.

(A) 24.8 **(B)** 32.9 **(C)** 0.248 **(D)** 0.329

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35. Li occurs in nature in two isotopic forms with masses 6.015 u and 7.016 u in the ratio 7.42 : 92.58. The average atomic mass of Li atom is _____

(A) 6.94 **(B)** 6.12 **(C)** 7.12 **(D)** 7.00

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36. Statement I : The atoms of different elements having same mass number but different atomic numbers are known as isobars.

Statement II : The sum of protons and neutrons, in the isobars is always different.

(A) Both statements I and II are true and statement II is the correct explanation of statement I.

(B) Both statements I and II are true but statement II is not the correct explanation of statement I.

(C) Statement I is true but statement II is false. **(D)** Statement I is false but statement II is true.

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37. Solid $\rightleftharpoons$ Liquid $\rightleftharpoons$ Gas . Which of the following statements is correct?

(A) Conversion of gas to liquid can be done by increasing pressure and temperature.

(B) Conversion of liquid to solid can be done by increasing temperature and reducing pressure.

(C) Conversion of solid to gas can be done by decreasing temperature and increasing pressure.

(D) Conversion of liquid to gas can be done by increasing temperature and reducing pressure.

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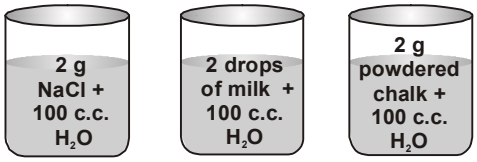
38. Following are three beakers containing mixtures as given below.



Identify the correct statement.

(A) (*X*) and (*Z*) represent suspension, (*Y*) represents colloid.

(B) (*X*) and (*Y*) represent true solution, (*Z*) represents suspension.

(C) (*X*) represents true solution, (*Y*) represents colloid and (*Z*) represents suspension.

(D) (*X*) represents true solution, (*Y*) represents suspension and (*Z*) represents colloid.

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39. Match Column I with Column II and select the correct option from the codes given below.

Column I	Column II
(a) Liquid	**(p) Highly compressible**
(b) Gas	**(q) Definite volume**
(c) Plasma	**(r) Super low density**
(d) Bose-Einstein condensate	**(s) Super energetic**

(A) (a) - (p), (b) - (q), (c) - (r), (d) - (s) **(B)** (a) - (q), (b) - (p), (c) - (r), (d) - (s)

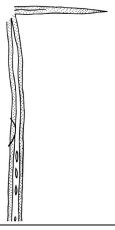
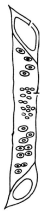
(C) (a) - (q), (b) - (p), (c) - (s), (d) - (r) **(D)** (a) - (r), (b) - (p), (c) - (q), (d) - (s)

40. Choose the correct statement.

(A) Components of air cannot be separated at different heights.
(B) The constituents of air can be separated by physical means.
(C) Air is a heterogeneous mixture.
(D) All of these.

BIOLOGY

41. Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres. One of these components helps in sideways conduction of water, stores food and is living. Which of the following figures represents that component?

(A) 
(B) 
(C) 
(D) 

42. Meristematic tissues of plants include

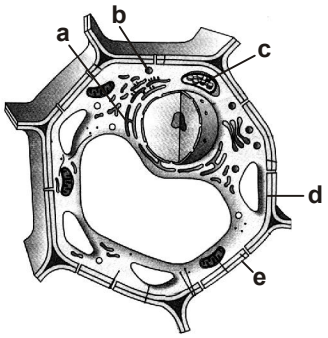
(A) Mature fruits, tips of stem and root, cork cambium
(B) Stem and root tips, vascular cambium, cork cambium
(C) Vascular cambium, cork cambium, mature leaves
(D) Tips of mature leaves and mature fruits

43. Match column I with column II and select the correct option from the codes given below.

	Column I		Column II
(a)	Areas of protected land for conservation of wild life, plant and animal resources and traditional life of the tribals living in the area	(i)	National Park
(b)	Area reserved for wild life where they can freely use the habitats and natural resources	(ii)	Biosphere Reserve
(c)	Areas where animals are protected from any disturbance to them and their habitat	(iii)	Sanctuary

(A) (a) - (ii), (b) - (i), (c) - (iii)
(B) (a) - (i), (b) - (ii), (c) - (iii)
(C) (a) - (ii), (b) - (iii), (c) - (i)
(D) (a) - (iii), (b) - (ii), (c) - (i).

44. The diagram shows a plant cell as seen under a microscope. Match the functions of the organelles mentioned as a, b, c, d, e.



	Control of entry of substances	Keep the cell clean	Detoxification	Photosynthesis	Rigidity and shape of cell
(A)	e	a	b	c	d
(B)	a	b	c	d	e
(C)	c	a	e	b	d
(D)	d	b	a	c	e

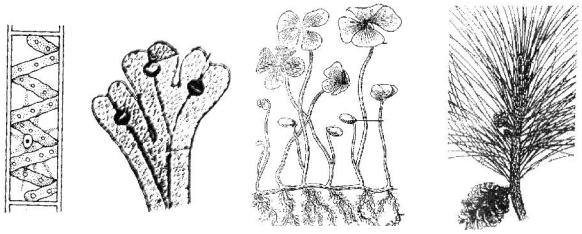
45. Match column I with column II and select the correct answer from the codes given below.

Column I	Column II
(a) Squamous epithelium	(i) Iris of eye
(b) Columnar epithelium	(ii) Fallopian tube
(c) Cuboidal epithelium	(iii) Stomach
(d) Ciliated epithelium	(iv) Alveoli of the lungs
	(v) Internal ear
	(vi) Pancreatic duct
	(vii) Gall bladder

(A) (a)-(iii), (b)-(ii, vi), (c)-(i), (d)-(iv, vii)
(B) (a)-(iv, v), (b)-(iii, vii), (c)-(i, vi), (d)-(ii)
(C) (a)-(iv, v), (b)-(iii, vi), (c)-(ii), (d)-(i, vii)
(D) (a)-(i), (b)-(ii, v), (c)-(iii), (d)-(iv, vi)

46. In which of the given plants there is requirement of water to complete their life cycle?

(A) (i) and (ii)
(B) (i), (ii) and (iii)
(C) (ii) and (iii)
(D) (ii) and (iv)



(i) **(ii)** **(iii)** **(iv)**

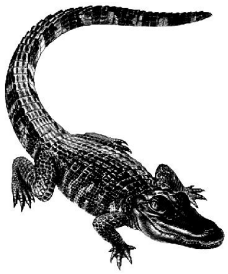
47. *Crotolaria juncea*, *Sesbania aculeata* and *Cyamopsis tetragonoloba* are

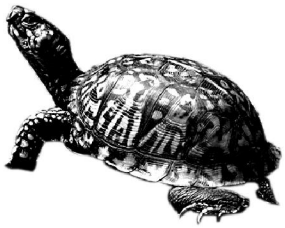
(A) Green manure **(B)** Farmyard manure **(C)** Compost **(D)** Mixed in fertilizers

48. These animals are cold-blooded, have scales and breathe through lungs. They have four-chambered heart. They lay eggs with tough covering and do not need to lay their eggs in water.
Which of the following animals is referred to in the above paragraph?

(A)


(B)


(C)


(D)


49. Microorganisms are used for the large scale production of alcohol, wine and acetic acid. X is used for commercial production of alcohol and wine. The process of conversion of sugar into alcohol is known as Y. What are X and Y respectively?

(A) *Lactobacillus*, Decantation **(B)** *Streptococcus*, Distillation
(C) Yeast, Fermentation **(D)** *Penicillium*, Aerobic respiration

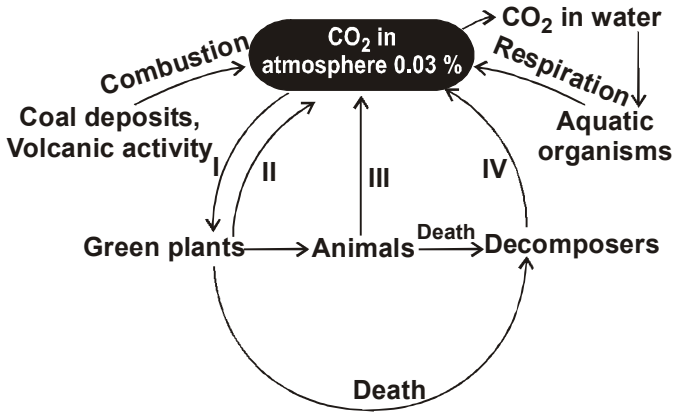
50. Which of the following statements are true/false?
(i) Oviparous animals give birth to young ones.
(ii) External fertilization takes place in frog.
(iii) An embryo is made up of a single cell.
(iv) A new human individual develops from a cell called gamete.
(v) *Amoeba* reproduces by binary fission. **(vi) A zygote is formed as a result of fertilization.**
(A) (i), (iii) & (iv) are false, (ii), (v) & (vi) are true **(B)** (i) & (iii) are false, (ii), (iv), (v) & (vi) are true
(C) (iii) & (iv) are false, (i), (ii), (v) & (vi) are true **(D)** (iii) & (v) are false, (i), (ii), (iv) & (vi) are true.

51. *X* is a phylum. The organisms belonging to *X* are bilaterally symmetrical, triploblastic and possess pseudocoelom. Identify *X*.

(A) Platyhelminthes **(B)** Annelida **(C)** Coelenterata **(D)** Nematoda

52. Select the correct statement(s).
(i) *Helicobacter pylori* is the causal agent of peptic ulcer.
(ii) *Staphylococci* is responsible for acne.
(iii) *Trypanosoma* causes kala azar. **(iv) *Leishmania donovani* is a bacterium.**
(A) (i) and (ii) **(B)** (ii) and (iii) **(C)** Only (iv) **(D)** Only (ii)

53. The given figure shows the carbon cycle in nature. Identify correctly the processes labelled as I, II, III and IV.

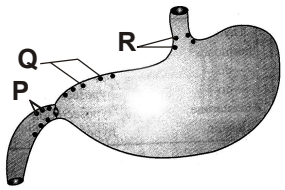


	I	II	III	IV
(A)	Photosynthesis	Respiration	Respiration	Decomposition
(B)	Respiration	Photosynthesis	Respiration	Decomposition
(C)	Photosynthesis	Combustion	Respiration	Decomposition
(D)	Photosynthesis	Combustion	Combustion	Decomposition

54. Plants get their nitrogen

(A) By absorbing nitrogen compounds present in the soil **(B)** By taking in nitrogen gas from the air into the leaves
(C) From dissolved nitrogen gas in the water in the soil **(D)** From photosynthesis

55. The given figure shows the position of peptic ulcers. These ulcers cause acidity- related pain and bleeding. Identify the names of these ulcers from the codes given below.



	P	Q	R
(A)	Oesophageal	Gastric	Duodenal
(B)	Gastric	Gastric	Gastric
(C)	Duodenal	Oesophageal	Gastric
(D)	Duodenal	Gastric	Oesophageal

56. Statement I : UV radiation causes photodissociation of ozone into O_2 and O, thus causing damage to ozone layer.

Statement II : Ozone hole is resulting in global warming and climatic change.

(A) Both statements I and II are true and statement II is the correct explanation of statement I
(B) Both statements I and II are true but statement II is not the correct explanation of statement I
(C) Statement I is true but statement II is false **(D)** Statement I is false but statement II is true

57. Match column I (common name) with column II (scientific name) and select the correct option from the codes given below.

Column I	Column II
(a) Feather star	**(i)** ***Draco***
(b) Climbing perch	**(ii)** ***Hyla***
(c) Ostrich	**(iii)** ***Hemidactylus***
(d) Flying lizard	**(iv)** ***Rana tigerina***
(e) Tree frog	**(v)** ***Anabas***
	(vi) ***Struthio camelus***
	(vii) ***Antedon***

(A) (a)-(vii), (b)-(v), (c)-(vi), (d)-(iii), (e)-(iv) **(B)** (a)-(i), (b)-(v), (c)-(vi), (d)-(ii), (e)-(vii)
(C) (a)-(vii), (b)-(v), (c)-(vi), (d)-(i), (e)-(ii) **(D)** (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv), (e)-(v)

58. Which of the following is not a green house gas?

(A) Sulphur dioxide **(B)** Methane
(C) Carbon dioxide **(D)** Nitrous oxide

59. ***Labeo*** **and** ***Catla*** **are**

(A) Fresh water fishes **(B)** Marine fishes

(C) Brackish water fishes **(D)** All of these

---

60. Statement I : Chemical pesticides are more hazardous as compared to biopesticides.
Statement II : Chemical pesticides are mostly non specific and pollute the atmosphere.

(A) Both statements I and II are true and statement II is the correct explanation of statement I

(B) Both statements I and II are true but statement II is not the correct explanation of statement I

(C) Statement I is true but statement II is false

(D) Statement I is false but statement II is true

MATHEMATICS

61. The value of $\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\frac{1}{\sqrt{4}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{6}}+\frac{1}{\sqrt{6}+\sqrt{7}}+\frac{1}{\sqrt{7}+\sqrt{8}}+\frac{1}{\sqrt{8}+\sqrt{9}}$ **is** _____ .

(A) 0 **(B)** 1 **(C)** 2 **(D)** 4

---

62. If $\frac{9^n \times 3^2 \times (3^{-\frac{n}{2}})^{-2} - (27)^n}{3^{3m} \times 2^3} = \frac{1}{27}$ **then** $m - n$ **is** _____ .

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4

---

63. Evaluate $\frac{40}{2\sqrt{10}+\sqrt{20}+\sqrt{40}-2\sqrt{5}-\sqrt{80}}$ **when it is given that** $\sqrt{5} = 2.236$ **and** $\sqrt{10} = 3.162$

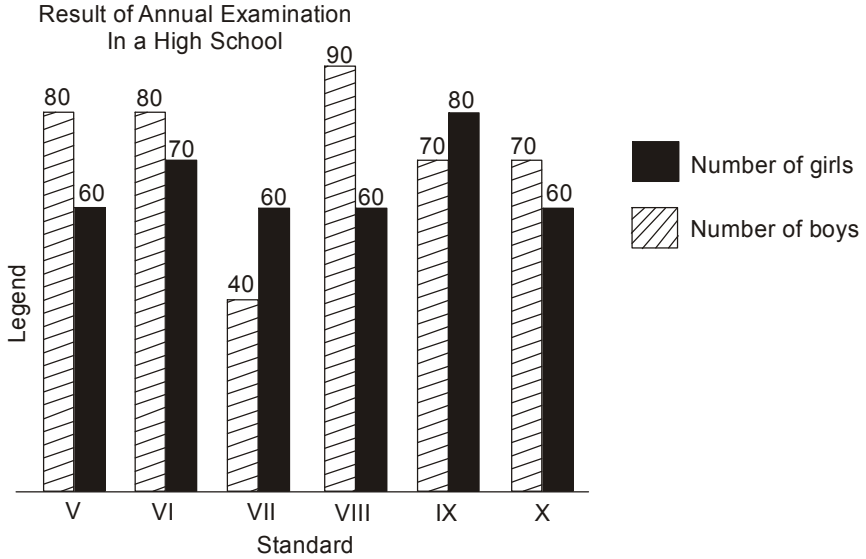
(A) 10.796 **(B)** 10.976 **(C)** 10.679 **(D)** 10.769

---

64. Find the value of k **if** $(x - 1)$ **is a factor of** $4x^3 + 3x^2 - 4x + k$.

(A) 3 **(B)** –5 **(C)** 5 **(D)** –3

DIRECTION (65-66) : Study the following graph and answer the given questions :



65. In which standard is the difference between the results of girls and boys maximum ?

(A) V **(B)** VII **(C)** X **(D)** VIII

---

66. In which standard is the result of boys less than the average result of the girls?

(A) VII **(B)** IX **(C)** VI **(D)** VIII

67. The taxi fare in a city is as follows : For the first kilometre, the fare is ₹ 10 and for the subsequent distance it is ₹ 7 per kilometre. Taking the distance covered as x km and total fare as ₹ y, a linear equation for this information is

(A) $7x + y + 3 = 0$ **(B)** $7x - y + 3 = 0$ **(C)** $7x + y - 3 = 0$ **(D)** $7x - y - 3 = 0$

---

68. Which of the following is Euclid's axiom?

(A) The things which coincide with one another are not equal to one another.

(B) If equals are subtracted from equals, the remainders are not equal.

(C) The whole is greater than the part. **(D)** None of these.

---

69. Study the given number series :

7 8 9 7 6 5 3 4 2 8 9 7 2 4 5 9 2 9 7 6 4 7

How many 7's are preceded by 9 and followed by 6?

(A) 2 **(B)** 3 **(C)** 4 **(D)** 5

---

70. If $2^x = 3^y = 6^z$, then $\frac{1}{z} = \frac{1}{x} + \frac{1}{y}$ is

(A) True **(B)** False **(C)** Can't say **(D)** Data is insufficient.

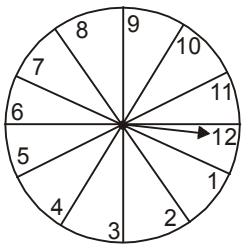
---

71. Find the value of R : $\frac{a^2 - 19a - 25}{a - 7} = a - 12 + \frac{R}{a - 7}$

(A) –109 **(B)** –88 **(C)** –84 **(D)** –64

---

72. A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the number, 1, 2, 3, ..., 12 as shown in figure. What is the probability that it will point to multiple of 4.

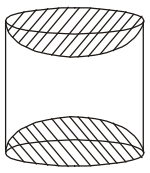


(A) $\frac{1}{2}$ **(B)** $\frac{1}{3}$

(C) $\frac{1}{4}$ **(D)** $\frac{1}{6}$

---

73. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in the figure. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.



(A) 280 cm^2

(B) 72.68 cm^2

(C) 195.46 cm^2

(D) 374 cm^2

---

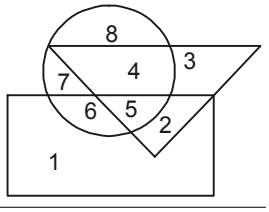
74. The measurement of a window is 3.6 m × 1.8 m. If 6 doors are to be fixed in that window in two rows, measurements of each door should be

(A) 120 cm × 90 cm **(B)** 60 cm × 60 cm **(C)** 24 cm × 18 cm **(D)** 240 cm × 180 cm

---

75. In the given diagram the triangle represents doctors, the circle represents players and the rectangle represents artists.

Which numbered space in the diagram represents doctors who are also players and artists?

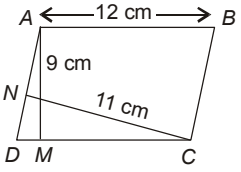


(A) 2 **(B)** 3

(C) 4 **(D)** 5

---

76. In parallelogram *ABCD*, *AB* = 12 cm. The altitudes corresponding to the sides *AB* and *AD* are respectively 9 cm and 11 cm. Find *AD*.



(A) $\frac{108}{11}$ cm **(B)** $\frac{108}{10}$ cm

(C) $\frac{99}{10}$ cm **(D)** $\frac{108}{17}$ cm

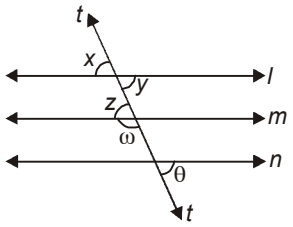
---

77. If P denotes '×', T denotes '–', M denotes '+' and B denotes '÷', then what will the value of the expression 28B7P8T6M4B2P8

(A) $\frac{23}{9}$ **(B)** 42 **(C)** 32 **(D)** $\frac{-9}{2}$

---

78. In figure, if *l* || *m*, *m* || *n*, $\omega = (3p + 5)°$ and $\theta = (2p)°$, then find $x + y + z + \omega + \theta$.



(A) 390°

(B) 420°

(C) 360°

(D) 180°

---

79. If *abc* = 1, then

$$\left(1+a+\frac{1}{b}\right)^{-1}+\left(1+b+\frac{1}{c}\right)^{-1}+\left(1+c+\frac{1}{a}\right)^{-1}=$$

(A) 1 **(B)** 0 **(C)** –1 **(D)** Not defined

---

80. The average of *n* numbers $x_1, x_2, x_3, \ldots\ldots, x_n$ is *A*. If x_1 is replaced by $(x + a)x_1$, x_2 is replaced by $(x + a)x_2$,..... then the new average is _____ .

(A) $(x + a)\,A$ **(B)** $\frac{(x-1)A+nx_n}{n}$ **(C)** $\frac{nA+(n+1)x_n}{n}$ **(D)** $\frac{(n+1)A+x_n}{n}$

---

81. Between two rational numbers

(A) There is exactly one rational number

(B) There are exactly two rational numbers

(C) There are infinitely many rational numbers

(D) There are only rational numbers and no irrational number

---

82. In an experiment, a coin is tossed 500 times. If the head turns up 280 times then the experimental probability of getting (i) a head (ii) a tail is _____ .

(A) $\frac{14}{25}, \frac{11}{25}$ **(B)** $\frac{11}{20}, \frac{12}{20}$ **(C)** $\frac{12}{25}, \frac{10}{25}$ **(D)** $\frac{9}{25}, \frac{11}{25}$

---

83. If $N = \frac{\sqrt{\sqrt{5}+2}+\sqrt{\sqrt{5}-2}}{\sqrt{\sqrt{5}+1}} - \sqrt{3-2\sqrt{2}}$ then *N* equals to _____ .

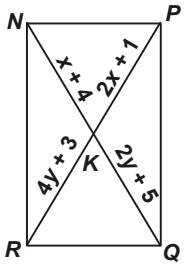
(A) 1 **(B)** $2\sqrt{2}-1$ **(C)** $\frac{\sqrt{5}}{2}$ **(D)** All of these

---

84. If '*a*' and '*b*' are rational numbers and $\frac{2+\sqrt{3}}{2-\sqrt{3}} = a + b\sqrt{3}$, then *b* =

(A) 4 **(B)** 7 **(C)** 6 **(D)** 8

85. In the adjoining figure, *NPQR* is a rectangle. What is the length of *NQ* (in units)?



(A) 1 units

(B) 3 units

(C) 7 units

(D) 14 units

---

86. A spherical ball of lead, 3 cm in diameter is melted and recast into three spherical balls. The diameter of two of these are 1.5 cm and 2 cm respectively. The diameter of the third ball is _____ .

(A) 2.66 cm **(B)** 2.5 cm **(C)** 3 cm **(D)** 3.5 cm

---

87. Point of intersection of the lines $x + y = 1$ and $2x + 2y = 4$ are _____ .

(A) (1, 1) **(B)** (2, 2) **(C)** No intersection point **(D)** Many point

---

88. A swimming pool is being filled with water at a rate of $2\frac{1}{2}$ cm/minute. The owners started filling the pool at 6.00 a.m. What time was it when the water was 2 metres ?

(A) 7:10 a.m. **(B)** 7:20 a.m. **(C)** 7:30 a.m. **(D)** 8:00 a.m.

---

89. The altitude drawn to the base of an isosceles triangle is of length 8 cm and the perimeter is 32 cm. The area of the triangle is _____

(A) 32 cm^2 **(B)** 40 cm^2 **(C)** 48 cm^2 **(D)** 56 cm^2

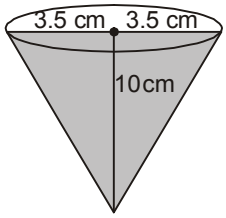
---

90. A sum of money becomes ₹ 6690 after three years and ₹ 10, 035 after six years on compound interest. The sum is _____ .

(A) ₹ 4400 **(B)** ₹ 4445 **(C)** ₹ 4460 **(D)** ₹ 4520

---

91. Conical glass in figure is filled with soft drink upto the brim. The quantity of soft drink required to fill 30 such glass is



(A) 3.8 L

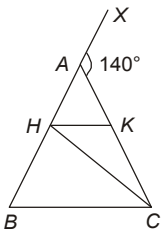
(B) 3.85 L

(C) 4.5 L

(D) 2.56 L

---

92. In the figure *AB* = *AC*, *CH* = *CB* and *HK* || *BC*. If the exterior angle *CAX* is 140° then the angle *HCK* is

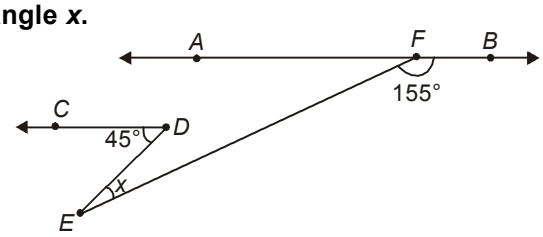


(A) 45° **(B)** 70°

(C) 110° **(D)** 30°

---

93. In figure, *AB* || *CD*, find angle *x*.



(A) 20° **(B)** 25° **(C)** 30° **(D)** 35°

---

94. A triangle and a trapezoid are equal in area. They also have the same altitude. If the base of the triangle is 18 inches, then mean of parallel sides of the trapezoid is _____ .

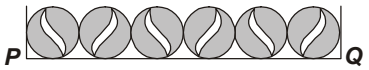
(A) 36 inches **(B)** 9 inches **(C)** 18 inches **(D)** Data insufficient

---

95. The diagram below shows the cross section of six identical marbles touching each other on a horizontal surface. If the volume of a marble is $\frac{9\pi}{2}$ cm^3, calculate the length of *PQ*, in cm.

(A) 9 cm **(B)** 27 cm

(C) 18 cm **(D)** 36 cm



---

96. The mean of the data x_1, x_2, ..., x_n is 102, then mean of the data $5x_1$, $5x_2$, ..., $5x_n$ is

(A) 102 **(B)** 204 **(C)** 606 **(D)** 510

---

97. If $a = \frac{3+\sqrt{5}}{2}$, then $a^2 + \frac{1}{a^2} =$

(A) 14 **(B)** 10 **(C)** 7 **(D)** None of these

---

98. Which is always a correct conclusion about the quantities in the equation $y = x + 4$?

(A) It is linear equation in two variable

(B) When the value of x is negative, the value of y is also negative

(C) The variable y is always less than x

(D) As the value of x increases, the value of y decreases

---

99. Rohan ranks eighth from the top and thirty-eight from the bottom in the class. How many students are these in the class ?

(A) 46 **(B)** 49 **(C)** 45 **(D)** 38

---

100. The mean, median and mode of the following numbers
7, 4, 3, 5, 6, 3, 3, 2, 4, 3, 4, 3, 3, 4, 4, 3, 2, 2, 4, 3, 5, 4, 3, 4, 3, 4, 3, 1, 2, 3 are _____ .

(A) 3.47, 3, 3 **(B)** 3, 3, 3 **(C)** 4, 3, 3 **(D)** 5, 4, 3

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

ANSWER SHEET

DARKEN YOUR CHOICE WITH HB PENCIL OR BLUE/BLACK BALL POINT PEN ONLY

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

ANSWER KEY

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