All India Mock for RRB Group D Exam 2024 on 6th & 7th April 2024

Q1. In the given letter-cluster pairs, first letter-cluster is related to the second letter-cluster following a certain logic. Study the given pairs carefully; and from the given options select the pair that follows the same logic.
TORPEDO : DEOOPRT
FUCKER : CEFKRU
(a) CYNICAL : ACCLINY
(b) CURTAIN : RUCNIAT
(c) PERTAIN :AEINPRT
(d) CLOSURE : OLCERUS

Q2. Four friends Ramniwas, Ramesh, Ramsingh and Raman received their PhD degrees in consecutive months of same calendar year. Ramniwas received his degree exactly one month prior to Ramsingh. Raman received his degree exactly one month after Ramesh, Ramniwas received his degree in September and Raman did not obtain his degree before Ramniwas. In which month did Ramesh receive his degree?
(a) August
(b) October
(c) November
(d) December

Q3. A statement is given followed by two assumptions numbered I and II. You have to assume everything in the statement to be true and decide which of the given assumptions is/are implicit in the statement.
Statement:
The demand for smartphones and laptops has increased substantially since the introduction of online classes in schools.
Assumptions:
I. People are buying smartphones and laptops to enable their children to attend online classes
II. Desktop computers cannot be used to attend online classes.
(a) Only assumption II is implicit
(b) Only assumption I is implicit
(c) Neither assumption I nor II is implicit
(d) Both assumptions I and II are implicit

Q4. From point X, a girl walks 70 m towards the north. Then, she takes a left turn and walks 150 m Then. she takes a left turn and walks 70 m. Then, she takes another left turn and walks 90 m. She then takes a right turn and walks 100 m. Finally. she Takes a left turn and walks 60 m to reach point Z. How far and in which direction is point Z from point X?
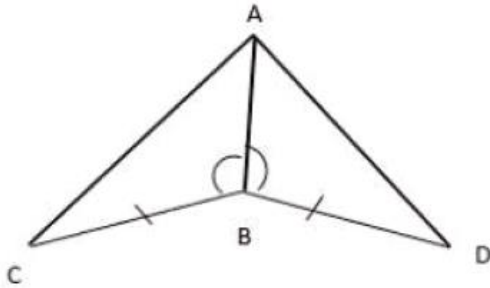[All turns are 90 degree turns only]
(a) 60 m, South
(b) 60 m, North
(c) 100 m, North
(d) 100 m, South

Q5. The HCF of two numbers is 7 and their LCM is 434. If one of the numbers is 14, find the other.
(a) 146
(b) 217
(c) 52
(d) 48

Q6. In the given figure ∠ABC = ∠ABD, BC = BD then Δ CAB≅ Δ -------

(a) DBA
(b) DAB
(c) ADB
(d) ABD

Q7. Study the given letter. symbol series and answer the question that follows.
L@S*E ^BU#WI<EM@OS#B*H!A&L<O
If we replace each of the vowels with any consonants and similarly if we replace each of the consonants in the original series with any vowel, then how many consonants will be immediately followed by a symbol in the resultant series thus formed?
(a) 5
(b) 7
(c) 6
(d) 4

Q8. In which organism sex is not determined genetically?
(a) Sparrow
(b) Butterfly
(c) Snail
(d) Moth

Q9. The age of a father six years ago was six times the then age of his daughter. Three years hence, the father will be thrice as old as his daughter. What is the present age of the daughter?
(a) 15 years
(b) 12 years
(c) 17 years
(d) 20 years

Q10. Two wires A and B are made of same material and have the same length but different cross-sectional areas. If the resistance of wire A is 15 times the resistance of wire E. the ratio of the cross-sectional area of wire A to that of wire B is:
(a) 1 : 4
(b) 1 : 15
(c) 4 : 1
(d) 16 : 1

Q11. Each of W, X, Y, Z, A, B and C has a wedding to attend on a different day of a week starting from Monday to Sunday of the same week. C has to attend wedding immediately after A, Y has to attend a wedding on one of the days before B and W. Only Z has to attend a wedding before A. X has to attend a Wedding on Friday. B does not have to attend a wedding on Sunday. On which day of the week does Y have to attend a wedding?
(a) Saturday
(b) Sunday
(c) Wednesday
(d) Thursday

Q12. Who was conferred with Major Dhyan Chand Khel Ratna Award 2021 for his outstanding achievements in Para shooting?
(a) Harman Preet Singh
(b) Praveen Kumar
(c) Manish Narwal
(d) Sharad Kumar

Q13. Which of the following alphanumeric clusters will replace the question mark (?) in file series to make it logically complete?
1AZC2, 3DYF4, 7GXI8, ?
(a) 15 JWL 16
(b) 13 IJK 14
(c) 13 IWK 14
(d) 15 IVK 16

Q14. A cost incurred in the past and that cannot be recovered in the future is called _____.
(a) economic cost
(b) floating cost
(c) sunk cost
(d) prime cost

Q15. If $2^x \times 4^{12} \times 8^3 = 16^{11}$, then the value of x is:
(a) 14
(b) 12
(c) 11
(d) 13

Q16. Identify the personality from among the following who received the Padma Shri 2022 award in the sports field.
(a) Tara Jauhar
(b) Shaibal Gupta
(c) Shivnath Mishra
(d) Avani Lekhara

Q17. A can finish painting a sari in 11 days. B in 20 days and C in 55 days. If they work independently. In how many days can the work be completed if A is assisted by B on every odd numbered day and by C on every even numbered day till the work completes?
(a) 8 days
(b) 18 days
(c) 12 days
(d) 9 days

Q18. Eight friends, A, B, C, D, E, F, G and H are sitting around a square table timing the centre of the table. Four of them are sitting at the corners while the other four are sitting at the exact centre of sides of the table. Both A and C are sitting at the opposite corners. F and D are sitting at the opposite corners. Only G is between A and F. Only B is between A and D.

H is to the immediate left of C. G is to the immediate right of F. E is second to right of H. D is second to left of C. D is third to left of E. Who is sitting second to left of B?
(a) E
(b) F
(c) G
(d) H

Q19. P, Q, R, S and T are sitting in a straight line, facing north. S is an immediate neighbour of both P and R. R is an immediate neighbour of both S and Q Q is an immediate neighbour of both R and T. Who are the immediate neighbours of Q?
(a) S and R
(b) S and T
(c) P and R
(d) R and T

Q20. What does the term 'Upa' in the term Upanishad denote?
(a) Nearness
(b) Totality
(c) Secret
(d) Happiness

Q21. "Save the Narmada' movement originated as a protest against raising the height of Sardar Sarovar Darn. Some disadvantages of building dams are mentioned below. which one is an advantage?
(a) Helpful in irrigation and electricity production
(b) Lot of public money is used
(c) Many tribals and peasants are displaced
(d) Causes deforestation and loss of biodiversity

Q22. Arrange the following metals in the decreasing order of reactivity:
K, Na, Zn, Cu, Hg, Ag
(a) K > Na > Zn > Ag > Hg > Cu
(b) K > Na > Zn > CU > Ag > Hg
(c) K > Na > Zn > Cu > Hg > Ag
(d) K > Na > Zn > Hg > Cu > Ag

Q23. A man invested Rs. 75,000 at the rate of 7 ½ % per annum simple interest for 6 years. Find the amount he will receive after 6 years.
(a) Rs. 69,000
(b) Rs. 75,000
(c) Rs. 1,12,500
(d) Rs. 1,08,750

Q24. What is the direction of the Inter Tropical Convergence Zone in winter?
(a) Westward
(b) Southward
(c) Northward
(d) Eastward

Q25. A student focusses a sharp image of sun using a spherical mirror on a sheet of paper. which starts to burn after some time. Which of the following statement/statements about the mirror is/are correct?
(A) It is concave spherical minor
(B) It has positive focal length
(C) It is a converging mirror
(a) Both (A) and (C)
(b) Both (A) and(B)
(c) (A), (B) and (C)
(d) Both (B) and (C)

Q26. Which of the following statements is FALSE?
(a)In the first stage of respiration, breakdown of glucose takes place.
(b)In the mitochondria, acetic acid is broken down utilising oxygen.
(c) Pyruvic acid is produced in the first stage of respiration.
(d) Oxygen is not necessary for the fermentation process.

Q27. The sum of the roots of the quadratic equation $4x^2 + 7x - 21 = 0$ is:
(a) $-\dfrac{21}{4}$
(b) -21
(c) $-\dfrac{7}{4}$
(d) $\dfrac{7}{4}$

Q28. What is the area of an equilateral triangle whose each side is 14 cm long?
(a) $21\sqrt{3}\ cm^2$
(b) $14\sqrt{3}\ cm^2$
(c) $35\sqrt{3}\ cm^2$
(d) $49\sqrt{3}\ m^2$

Q29. If 2 is subtracted from each odd digit and 1 is added to each even digit in the number 83252769. how many digits will occur more than once in the new number thus formed?
(a) None
(b) Three
(c) Two
(d) One

Q30. Which of the following is the commercial unit of electric energy?
(a) Calorie
(b) Kilowatt hour
(c) Joule
(d) Watt second

Q31. Aman travelled at a speed 20 m/min for 100 min. and at a speed of 70 m/min for 50 min. His average speed is
(a) $25\ m/min$
(b) $35\ m/min$
(c) $\dfrac{110}{3}\ m/min$
(d) $\dfrac{70}{3}\ m/min$

Q32. Panchayati Raj Institutions in India have been established following the _____ of the Constitution of India.
(a) 42nd Amendment Act
(b) 57th Amendment Act
(c) 73rd Amendment Act
(d) 86th Amendment Act

Q33. Sohan Singh Bhakna was the first president of the _____ founded by Indians in the United States of America in 1913.
(a) Swatantra Party
(b) Ghadar Party
(c) Swamj Party
(d) India Revolutionary patty

Q34. If θ is an acute angle, find the denominator A, when

$$(\cosec\ \theta - \cot\ \theta)^2 = \frac{1-\cos\theta}{A}$$

(a) $1 + \sin\theta$
(b) $\cosec\ \theta - 1$
(c) $1 + \cos\theta$
(d) $\cot\theta$

Q35. Amna has a younger sister whose age is 8 years less than that of Aruna. If Amna's sister's age is 18 years. Then Amna's age is:
(a) 28 years
(b) 26 years
(c) 10 years
(d) 24 years

Q36. Gayatri starts walking from her home and goes 100 m towards the south direction. She then turns right and walks 120 m. She then turns right and walks 100 m. She finally turns right again and walks 180 m. How far is she now from the starting point? (All rows are 90 degree turns only)
(a) 100m
(b) 50m
(c) 90m
(d) 60m

Q37. A cuboid of dimensions 18.5 cm × 12. 5 cm × 10 cm needs to be painted all over. Find the area to be painted.
(a) 1193 cm²
(b) 1157.5 cm²
(c) 934.56 cm²
(d) 1082.5 cm²

Q38. How many participants from India won the gold medal in the 14th International Olympiad on Astronomy and Astrophysics IIOAA 2021?
(a) 5
(b) 3
(c) 4
(d) 6

Q39. Venkat brought a second-hand scooter and spent 10% of the cost on its repairs. He sold the scooter for a profit of Rs. 2200 How much did he spend on repairs if he made a profit of 20%?
(a) Rs. 1,200
(b) Rs. 750
(c) Rs. 1,000
(d) Rs. 400

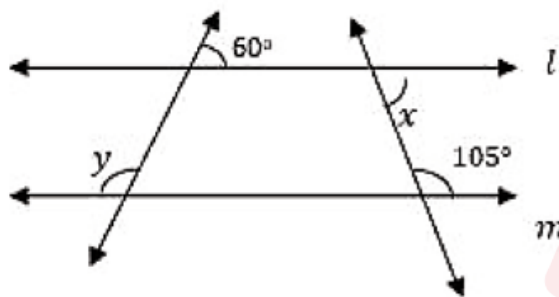**Q40.** In Newlands Octaves, the properties of which two elements were found to be the same?
(a) Li, Na
(b) Na, Mg
(c) H, Th
(d) Ca, CI

Q41. Which day of the calendar year is acknowledged as the 'Rare Disease Day'?
(a) 08 February
(b) 18 February
(c) 28 March
(d) 28 February

Q42. In the adjoining figure line *l* is parallel to m. What is the value of 2x + y?

(a) 320°
(b) 270°
(c) 150°
(d) 225°

Q43. As of July 2022, under the Pradhan Mantri Shram Yogi Maan-Dhan Yojana (PM-SYM) (Old Age Protection), what percentage of monthly contribution is payable by the beneficiary?
(a) 50%
(b) 25%
(c) 40%
(d) 30%

Q44. Which of the following numbers will replace the question mark (?) in the given series?
7,13, 21, 31, ?
(a) 44
(b) 41
(c) 42
(d) 43

Q45. What will come in place of the question mark(?) in the following equation, if '-' is interchanged with '×' and '÷' is interchanged with '+'?

$6 \div 16 \times 4 \div 9 - 8 + 2 \times 7 =?$
(a) 47
(b) -11
(c) 43
(d) 38

Q46. The balanced reaction for following chemical reaction is:
Barium sulphate + Aluminium chloride → Barium chloride + Aluminium sulphate

(a) $2BaSO_4 + 2AlCl_3 \rightarrow 2BaCl_2 + Al_2(SO_4)_3$

(b) $BaSO_4 + AlCl_3 \rightarrow BaCl_2 + Al_2(SO_4)_3$

(c) $BaSO_4 + AlCl_2 \rightarrow BaCl_2 + AlSO_4$

(d) $3BaSO_4 + 2AlCl_3 \rightarrow 3BaCl_2 + Al_2(SO_4)_3$

Q47. In a certain code language, PRECIOUS is written as KIVXRLFH and CLEAR is written as XOVZI How will DIRTYING be written in the same language?
(a) WHSGBRMT
(b) WRIFBRMS
(c) WRIGBRMT
(d) VRIGBROT

Q48. The bluish colour of water in deep sea is due to:
(a) reflection of light
(b) refraction of light
(c) scattering of light
(d) dispersion of light

Q49. Which of the following features says that people of India have a direct role in electing their representatives?
(a) Fundamental Rights
(b) Separation of Powers
(c) Secularism
(d) Parliamentary Form of Government

Q50. Find the number of 2-digit numbers divisible by both 2 and 4.
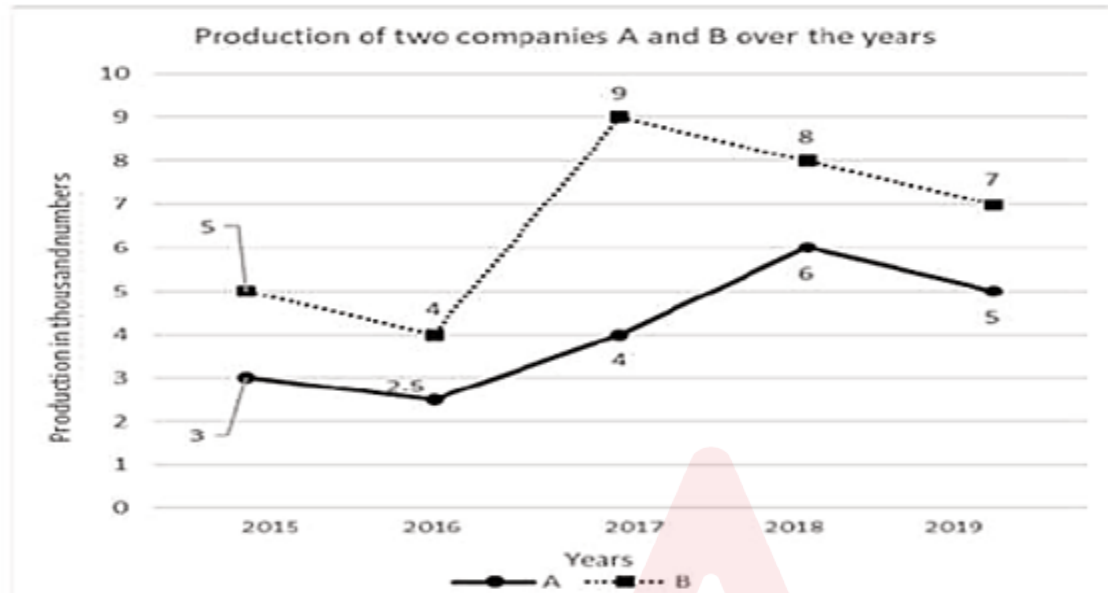(a) 18
(b) 42
(c) 22
(d) 32

Q51. In which year was Steel Authority of India incorporated?
(a) 1973
(b) 1983
(c) 1937
(d) 1979

Q52. The present ages of Shanthi and Keerthi are in the ratio of 7 : 3. After 5 years. Shanti's age will be 40. How old will Keerthi be after 5 years?

(a) 10 years
(b) 30 years
(c) 20 years.
(d) 15 years

Q53. Study the following graph carefully and answer the question.

For company A, what is the approximate percentage decrease in production from 2015 to 2016?
(a) 17%
(b) 22%
(c) 25%
(d) 20%

Q54. Study the given letter. symbol series and answer the question that follows.
L@S*J^BU#WR<E@NS#B*H!A&L<WQ
How many symbols are immediately followed by a consonant and immediately preceded by a vowel?
(a) 4
(b) 2
(c) 3
(d) 1

Q55. The "Mango Showers' phenomena in India is related to which season?
(a) Summer
(b) Rainy
(c) Winter
(d) Autumn

Q56. Gosikhurd National Irrigation Project is related to which of the following states?
(a) Uttar Pradesh
(b) West Bengal
(c) Maharashtra
(d) Punjab

Q57. What is the need to balance chemical equations?
(a) To indicate the ratio of volumes of reactants and products in which these react.
(b) To satisfy the law of conservation of mass.
(c) To satisfy the law of constant proportions.
(d) To indicate the ratio of masses of reactants and products in which these react.

Q58. A white precipitate will be formed if we add ammonia solution to:
(a) $Mg(NO_3)_2$ solution
(b) $Ba(NO_3)_2$ solution
(c) $AlCl_3$ solution
(d) KNO_3 solution

Q59. Which of the following substances are selectively reabsorbed from the initial filtrate by the tubular portion of the asylum in human kidney?
(a) Glucose, water, amino acids and proteins
(b) Salts, glucose, fats and water
(c) Glucose, water, salts and amino acids
(d) Water, glucose, salts and proteins

Q60. In this question, a statement is followed by two conclusions. Which of the two conclusions is/are true with respect to the statement?
Statement:
$T > G < E > F = B \le Z$
Conclusions:
I. $F = Z$
II. $E > B$
(a) Both conclusions I and II are true
(b) Neither conclusion I nor II is true
(c) Only conclusion II is true
(d) Only conclusion I is true

Q61. In a certain code language. TRY is written as 63 and NOT is written as 49. How Will DUG be written in line same language?
(a) 30
(b) 40
(c) 36
(d) 32

Q62. On which day is a major national festival celebrated every year to commemorate the enactment of the Constitution of India. which declared India to be a sovereign democratic and republic state?
(a) 26th January
(b) 15th August
(c) 23rd March
(d) 2nd October

Q63. Which of the following is not the use of bleaching powder?
(i) to make drinking water free from germs
(ii) in soda-acid fire extinguishers
(iii) as an oxidising agent in many chemical industries
(iv) for baking cakes

(a) ii
(b) iii
(c) iv
(d) i

Q64. Soil degradation is one of the major environmental problems being faced these days. A wide range of techniques to conserve soil are mentioned below. Select the INCORRECT option.
(a) Crop rotation
(b) Planting trees
(c) Terrace farming
(d) Overgrazing

Q65. If the sum of the roots of the quadratic equation $5x^2 + bx + 4 = 0$ is 9, then find the value of b.
(a) -25
(b) -45
(c) 0
(d) 20

Q66. A contraceptive technique that increases phagocytosis of sperms Within the uterus is:
(a) use of oral contraceptives
(b) use of condoms
(c) surgery
(d) use of copper T

Q67. The resistivity of a material is dependent on which of the following factors?
(a) Temperature
(b) Length
(c) Resistance
(d) Area of cross section

Q68. A convex mirror used as a rear-view minor of a car has a focal length of 2 m. If a bus is located at a distance of 3 m from the mirror, where will its image be formed?
(a) 1.2 in behind the mirror
(b) 1.83 m in float of the mirror
(c) 1.2 m in front of the mirror
(d) 1.83 m behind the mirror

Q69. Study the diagram and answer the question that follows. A = Academicians. E = Teachers. D = Women. B = Men and C = Doctors. The numbers inside the shapes indicate number of the respective persons.
What is the sum total number of the following:
i) women academicians who are teachers
ii) teachers who are doctors and
iii) men who are NEITHER teachers NOR academicians?
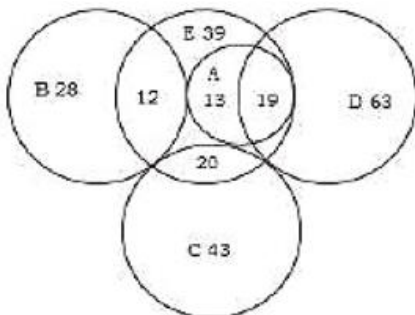
(a) 64
(b) 41
(c) 63
(d) 67

Q70. Guard cells are involved in the process of
(a) transport of food
(b) tropic movements
(c) circulation
(d) transpiration

Q71. Which of the following rules is used to determine the direction of induced current due to the motion of coil at right angle to the magnetic field?
(a) Fleming's right-hand rule
(b) Maxwell's corkscrew rule
(c) Right-hand thumb rule
(d) Fleming's left-hand rule

Q72. A man travels 80 km in three hours. He further travels for two more hours. Find the distance travelled in the latter two hours, if his average speed for the entire journey is 30 km/h.
(a) 70 km
(b) 150 km
(c) 120 km
(d) 90 km

Q73. Select the option that is related to the fifth number in the same way as the second number is related to the first number and the fourth number is related to the third number.
8: 14: :12: 22:: 21:?
(a) 40
(b) 18
(c) 42
(d) 26

Q74. In March 2022, which bank did RBI direct to stop onboarding new customers?
(a) AU Small Finance Bank
(b) Airtel Payment Bank
(c) Ujjiwan Small Finance Bank
(d) Paytm Payments Bank

Q75. A shopkeeper sold a book at a loss of 14%. If the selling price had been increased by Rs. 100. There would have been a gain of 6%. What was the cost price of the book?
(a) Rs. 650
(b) Rs. 500
(c) Rs. 970
(d) Rs. 450

Q76. Which of the following numbers will replace the question mark (?) in the given series?
14, 14, 17, 85, 92,?
(a) 924
(b) 828
(c) 418
(d) 628

Q77. If 5 + x, 2x + 7, 6x + 9, and y are in proportion when x = 2, find the value of y.
(a) 33
(b) 28
(c) 42
(d) 45

Q78. If '+' means '-'. '-' means '÷' , '÷' means '×' and '×' means '+'. what will come in plate of the question mark (?) in the following equation?
25×35-5+7÷2=?
(a) 19
(b) 14
(c) 16
(d) 18

Q79. V, W, X, Y, Z and A are six singers who have their concerts in different (lays of the same month. 12th, 14th, 16th, 21st, 25th and 31st of July.
W has his concert on one of the days before X. but not on 21st. V has his concert on 14th. Only A has his concert after X, Y has his concert before V. who has the concert on 21st of July?
(a) Z
(b) A
(c) Y
(d) X

Q80. Which of the following has the maximum non-metallic character is in group 16 elements?
(a) Po
(b) Se
(c) S
(d) O

Q81. A statement is given. followed by four conclusions given in the options. Find out which conclusion is one based on the given statement.
Statement: G ≥ P > T ≥ S > K = N < D
(a) P > D
(b) G ≥ D
(c) G > T
(d) N > T

Q82. Three statements are followed by three conclusions numbered I. II and III. You have to consider these statements to be true, even if they seem at variance from commonly known facts. Decide which of line given conclusions logically follow/s from the given statements.
Statements:
(A) All springs are brooks.
(B) Some brooks are creeks.
(C) No creek is tap.
Conclusions:
I. Some taps are creeks.
II. No spring is tap.
III. Some brooks are springs.

(a) Only conclusion I follows.
(b) Only conclusions III follows.
(c) Only conclusions II and III follow.
(d) Only conclusions I and II follow.

Q83. Amit's son was born on 10 January 2012. On what day of the week was he born?
(a) Tuesday
(b) Wednesday
(c) Monday
(d) Thursday

Q84. The value of $0.1\overline{6} + 0.1\overline{5} - 0.1\overline{3}$ is:
(a) 17/90
(b) 34/45
(c) 23/63
(d) 19/99

Q85. What will come in place of A and B, respectively, in the given double displacement reaction?
$A + B \rightarrow AgBr + KNO_3$
(a) HBr and NaOH
(b) Ag and HNO_3
(c) HBr and NaCl
(d) $AgNO_3$ and KBr

Q86. Which of the following is NOT a direct tax in India?
(a) Income Tax
(b) Corporate tax
(c) Excise Tax
(d) Capital Gain tax

Q87. KK Venugopal, the 15th Attorney General of India. received the first extension in his tenure in whjch of the following years?
(a) 2022
(b) 2019
(c) 2020
(d) 2021

Q88. If a : b = 2 : 3 and b : c = 3 : 4 , then a : b : c =?
(a) 3 : 4 : 2
(b) 2 : 4 : 3
(c) 2 : 3 : 4
(d) 3 : 2 : 4

Q89. Which of the following is an example of a human cell that has the ability to modify its shape?
(a) RBC
(b) WBC
(c) Brain cell
(d) Liver cells

Q90. A ray of light is incident on an interface separating two media along the normal to the interface. The angle between Ihe incident ray and refracted ray is equal to:
(a) 90°
(b) 0°
(c) 45°
(d) 30°

Q91. Ram is 55 years old and Sam is 25 years old. How many years ago was Ram three times as old as Sam?
(a) 7 years
(b) 15 years
(c) 5 years
(d) 10 years

Q92. X and Y can complete a piece of work in 8 days and 12 days respectively. If they work on alternate days. with X working on the first day, how long will it take the duo to complete the same work ?
(a) $9\frac{1}{2}$ days
(b) $9\frac{3}{5}$ days
(c) $9\frac{2}{3}$ days
(d) $9\frac{2}{5}$ days

Q93. If $\frac{x}{y} = \frac{3}{2}$, then find $\frac{x^2+y^2}{x^2-y^2}$.
(a) 9/5
(b) 11/5
(c) 13/5
(d) 7/5

Q94. Select the set in which the numbers are related in the same way as are the numbers of the following sets.
(NOTE: Operations should he performed on file whole numbers. without breaking down the numbers into its constituent digits. E.g. 13 – Operations on 13 such as adding/deleting/ multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and than performing mathematical operations on 1 and 3 is not allowed)
(4, 25, 6)
(3, 28, 9)
(a) (7, 22,3)
(b) (14, 55,4)
(c) (3, 81,6]
(d) (12,96,8)

Q95. Which of the following situations is/are possible?
(A) Magnetic field lines can be parallel to each other.
(B)Magnetic field lines can be concentric circles.
(C) Magnetic field lines can intersect each other.
(a) Both (A) and (B)
(b) Only (A)
(c) Both (A) and (C)
(d) Only (B)

Q96. The graph and the table below show the number of boys and girls passed in five different subjects is Physics, Chemistry, Biology, English and Hindi.

	Physics	Chemistry	Biology	English	Hindi
Girls	135	195	165	115	110
Boys	105	230	200	80	90
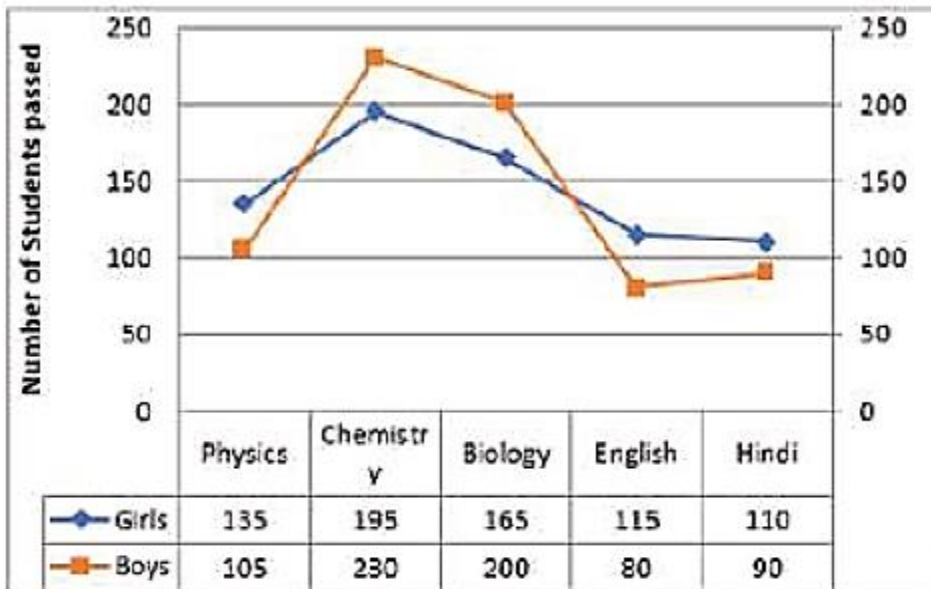
What is the ratio of the girls who have passed to Physics. Chemistry and Biology respectively?
(a) 9:13:11
(b) 9:13:8
(c) 8:11:14
(d) 9:15:13

Q97. In February 2022, which state launched open-air classroom 'Paray Shikshalaya'?
(a) Punjab
(b) West Bengal
(c) Kerala
(d) Haryana

Q98. Refer to the following letter series and answer the question.
(Left) T Y A N E C M K E W A F H E Q A P M N B E D H E K U W S D A N M A W E (Right)
How many such consonants are there in the series which are immediately preceded by a vowel and also immediately followed by a vowel?
(a) Five
(b) Four
(c) Three
(d) Six

Q99. Which of the following is the prominent language spoken by 8.03% population of India as per 2011 census?
(a) Gujarati
(b) Bengali
(c) Marathi
(d) Punjabi

Q100. Three statements are followed by four conclusions numbered I, II, III and IV. You have to consider these statements to be true. even if they seem at variance from commonly known facts Decide which of the given conclusions logically follow/s from the given statements.

Statements:

1. Some carnations are petunias.
2. All petunias are sunflowers.
3. Some sunflowers are not carnation.

Conclusions:

I. Some sunflowers are carnations.
II. All Carnations are sunflowers.
III. All petunias are carnations.
IV. No sunflower is carnation.
(a) Only conclusions II and III follow.
(b) Only conclusion IV follows.
(c) Only conclusions I follows
(d) Only conclusions I and IV follow.

Solutions

S1. Ans.(c)
Sol. Arrange the given words in their increasing alphabetical order sequence.

S2. Ans.(c)
Sol. Ramnivas: September
Ramsingh: October
Ramesh: November
Raman:December

S3. Ans.(b)
Sol. Assumption I is implicit in the statement since the statement directly mentions that the demand for smartphones and laptops has increased with the introduction of online classes, implying that people are buying these devices for this purpose.
Assumption II is not implicit in the statement. The statement does not mention the inadequacy of desktop computers for online classes; it only highlights an increase in demand for smartphones and laptops. The absence of information about desktop computers suggests that the statement is not implying they cannot be used.
Therefore, the correct answer is option (b)

S4. Ans.(d)
Sol.
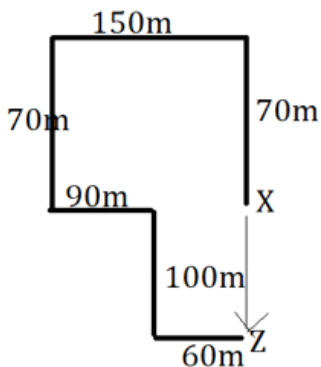
Z is 100m far away from point X and is in south direction.

S5. Ans.(b)
Sol.

HCF × LCM = Product of two numbers
7× 434 = 14 × 2nd number
Number = 217

S6. Ans.(b)
Sol.

There is a property of congrueny, SAS (Side- Angle- Side)
In triangle CAB and BAD
AB = AB (Common)
∠ABC = ∠ABD (Given)
BC= BD (Given)
Hence, by the above given property, Δ CAB≅ Δ DAB

S7. Ans.(a)
Sol.

Let we replace vowels by a consonant Y and each consonant by a vowel A.

L @ S * E ^ B U # W I < E M @ O S # B *H ! A & L < O

A @ A* Y^ A Y # A Y < Y E @ Y A # A *A ! Y& A < Y

There are Five consonants that are immediately followed by a symbol.

S8. Ans.(c)
Sol. In snails, sex is not determined genetically in the way it is in many other organisms. Many snail species are hermaphrodites, meaning they possess both male and female reproductive organs, allowing them to perform both roles in reproduction. This means that for snails, the determination of sex roles can be more fluid and is not strictly controlled by their genetics as it is in species like sparrows, butterflies, and moths, where sex is typically determined genetically. So, the correct answer is (c) Snail

S9. Ans.(b)
Sol.

Let the present age of daughter and father be D and F.
Six years ago,
$F - 6 = 6(D - 6)$
$F - 6 = 6D - 36$
$F - 6D = -30$............(1)
Three years hence,
$(F + 3) = 3(D + 3)$
$F - 3D = 6$.....................(2)
On solving first and second equation, we get
-3D = -36
D= 12 years.
Age of daughter = 12 years

S10. Ans.(b)
Sol. The resistance of a wire is directly proportional to its length and inversely proportional to its cross-sectional area. Since the wires have the same length, the ratio of their resistances is inversely proportional to the ratio of their cross-sectional areas.

Therefore, if the resistance of wire A is 15 times the resistance of wire B, the cross-sectional area of wire B must be 15 times larger than the cross-sectional area of wire A. So the ratio of the cross-sectional area of wire A to that of wire B is 1 : 15.

S11. Ans.(d)
Sol.
Monday - Z
Tuesday- A
Wednesday- C
Thursday-Y
Friday-X
Saturday-B
Sunday-W

S12. Ans.(c)
Sol. The answer is (c) Manish Narwal.
The Major Dhyan Chand Khel Ratna Award 2021 for outstanding achievements in Para shooting was conferred to (c) Manish Narwal. Manish Narwal is a prominent Indian para shooter who has made significant contributions and achievements in the sport.

S13. Ans.(a)
Sol.

S14. Ans.(c)
Sol. A cost incurred in the past and that cannot be recovered in the future is called (c) sunk cost. Sunk costs are expenditures that have already been made and cannot be recovered, and they should not affect future business decisions since they cannot be altered by any decision made now or in the future.

S15. Ans.(c)
Sol.
$$2^x \times 4^{12} \times 8^3 = 16^{11}$$
$$2^x \times 2^{24} \times 2^9 = 2^{44}$$
$$2^{x+24+9} = 2^{44}$$
Equate the powers,
$$x + 24 + 9 = 44$$
$$x = 11$$

S16. Ans.(d)
Sol. The personality from among the given options who received the Padma Shri 2022 award in the sports field is (d) Avani Lekhara. Avani Lekhara is an Indian Paralympic shooter who won gold and bronze medals at the 2020 Tokyo Paralympics, making her one of the standout athletes in her field.

S17. Ans.(a)
Sol.
Let the total work be 220 units
Efficiency of A = 20 unit per day
Efficiency of B = 11 unit per day
Efficiency of C = 4 unit per day
On 1st day, A and B work together = 31 $unit$
On 2nd day, A and C work together = 20+4 = 24 unit
In 2 days, work has to be completed = 55 unit
So, in 8 days, 220 unit of work has to be completed.

S18. Ans.(c)
Sol.
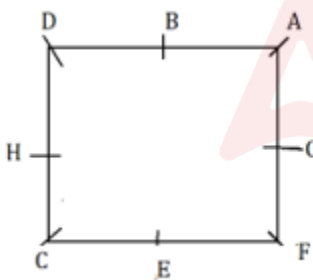
G is sitting second to left of B.

S19. Ans.(d)
Sol. There are two possible conditions:
TQRSP and PSRQT
From both the combination only, R and T are immediate neighbours of Q.

S20. Ans.(a)
Sol. The correct answer is (a) Nearness.
The term "Upanishad" comes from the Sanskrit words "upa" and "ni-sad," which together mean "sitting near." This refers to the traditional practice of students sitting close to their teacher to receive spiritual knowledge and teachings.

S21. Ans.(a)
Sol. The "Save the Narmada" movement, also known as the Narmada Bachao Andolan, indeed originated as a form of protest against the construction of large dams on the Narmada river, with the Sardar Sarovar Dam being one of the most prominent ones. The movement raised concerns over environmental issues, displacement of people, and the social and economic impacts of dam construction.

"Helpful in irrigation and electricity production" is an advantage of building dams. Dams are constructed not only for storing water but also for providing a reliable water source for irrigation, which is crucial for agriculture, especially in arid and semi-arid regions. Additionally, dams enable the generation of hydroelectric power, which is a renewable source of energy. Hydroelectric power plants convert the kinetic energy of flowing water into electricity, which is then used to supply power to homes, businesses, and industries. This form of energy production is cleaner compared to fossil fuels, as it does not emit greenhouse gases or pollutants during operation.

S22. Ans.(c)
Sol. Correct answer is (c)
To arrange the given metals in the decreasing order of their reactivity, we can refer to the reactivity series, which lists metals from the most reactive to the least reactive. Based on the reactivity series, the correct order is:
1. Potassium (K)
2. Sodium (Na)
3. Zinc (Zn)
4. Copper (Cu)
5. Mercury (Hg)
6. Silver (Ag)

This order reflects the metals' tendencies to lose electrons and form positive ions, with the more reactive metals (like potassium and sodium) losing electrons more readily than the less reactive ones (like silver).
So, the correct arrangement from the most reactive to the least reactive is:
K > Na > Zn > Cu > Hg > Ag
This corresponds to option (c) K > Na > Zn > Cu > Hg > Ag.

S23. Ans.(d)
Sol.

$$\text{Simple Interest} = \frac{Principal \times Time \times Rate}{100}$$

$$\text{S.I.} = \frac{75000 \times 6 \times 15}{100 \times 2}$$

$$\text{S.I.} = 750 \times 45$$

$$\text{S.I.} = \text{Rs. } 33750$$

$$\text{Amount} = \text{S.I.} + \text{Principal} = 75000 + 33750 = \text{Rs. } 108750$$

S24. Ans.(b)
Sol. The Correct answer is (b)
The Inter Tropical Convergence Zone (ITCZ) is a region near the equator where the trade winds of the Northern and Southern Hemispheres meet, leading to the formation of low-pressure areas and frequent thunderstorms. The position and movement of the ITCZ vary significantly with the seasons due to the differential heating of the earth's surface, which is influenced by the tilt of the earth's axis.

During the winter months in the Northern Hemisphere (approximately November to February), the ITCZ moves southward towards the equator or even into the Southern Hemisphere. This movement is due to the southward shift of the zone of maximum solar heating, as the sun's direct rays move south of the equator. As a result, the ITCZ follows this zone of maximum heating, leading to a general southward movement in the Northern Hemisphere's winter.

Therefore, the correct answer is: (b) Southward

This southward movement of the ITCZ in the Northern Hemisphere's winter results in changes in precipitation patterns, with regions just south of the equator experiencing wetter conditions, while regions farther north, which may be wet during the Northern Hemisphere's summer when the ITCZ is further north, may become drier.

S25. Ans.(a)
Sol. The Correct answer is (a) Both (a) and (c)

The scenario described involves focusing sunlight onto a sheet of paper using a spherical mirror, leading to the paper burning. This indicates that the mirror is used to concentrate sunlight at a point. Let's evaluate each statement based on this understanding:

(a) It is a concave spherical mirror: This statement is correct. A concave mirror, also known as a converging mirror, can focus parallel rays of light, such as those coming from the sun, to a single focal point. This is why it can concentrate enough heat at a specific point to cause the paper to burn.

(b) It has a positive focal length: This statement would be incorrect in the context of mirror terminology. In optics, concave mirrors are assigned a negative focal length because they cause light rays to converge to a focal point that is in front of the mirror. The convention is that the focal length is positive for convex mirrors (diverging mirrors) and negative for concave mirrors (converging mirrors). However, in some contexts, especially in general discussions or non-technical descriptions, you might encounter a less strict use of sign conventions. Still, according to the precise optical sign convention, concave mirrors have a negative focal length.

(c) It is a converging mirror: This statement is correct. A concave mirror is indeed known as a converging mirror because it converges parallel rays of light to a focal point. This property is what allows the mirror to focus sunlight onto the paper and cause it to burn.

Therefore, the correct statements about the mirror, strictly speaking from an optical physics standpoint, are:
- It is a concave spherical mirror (a).
- It is a converging mirror (c).

S26. Ans.(b)
Sol. The statement that is FALSE among the given options is (b) In the mitochondria, acetic acid is broken down utilising oxygen.

The correct statement should be that in the mitochondria, pyruvic acid (not acetic acid) is converted into acetyl-CoA before entering the citric acid cycle (also known as the Krebs cycle) where it is completely oxidized to carbon dioxide (CO_2) utilizing oxygen. Acetic acid's direct involvement in this description is inaccurate for the context of cellular respiration stages.

S27. Ans.(c)
Sol.

The sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is $-\frac{b}{a}$.

On comparing the given quadratic equation, we get the value of $b = 7$ and $a = 4$

So, Sum of roots $= -\frac{b}{a} = -\frac{7}{4}$

S28. Ans.(d)
Sol.

Area of equilateral triangle $= \frac{\sqrt{3}}{4}(Side)^2 = \frac{\sqrt{3}}{4} \times 196 = 49\sqrt{3}\ m^2$

S29. Ans.(c)
Sol. The modified number, after subtracting 2 from each odd digit and adding 1 to each even digit in 83252769, is 91333577. In this number, there are two digits that occur more than once:

- The digit '3' occurs three times.
- The digit '7' occurs twice.

Therefore, the number of digits that occur more than once in the new number is two.

S30. Ans.(b)
Sol. The commercial unit of electric energy is (b) Kilowatt-hour.

The kilowatt-hour (kWh) is a unit of energy equivalent to one kilowatt (1 kW) of power expended for one hour of time. It is commonly used by electricity companies for billing purposes, representing the amount of energy a customer uses.

S31. Ans.(c)
Sol.

$$\text{Average Speed} = \frac{Total\ distance}{Total\ time}$$

$$\text{Average Speed} = \frac{2000+3500}{150} = \frac{5500}{150} = \frac{110}{3}\ m/min$$

S32. Ans.(c)
Sol. Panchayati Raj Institutions in India were established following the 73rd Amendment Act of the Constitution of India. This significant amendment, enacted in 1992, aimed to provide a constitutional status to the Panchayati Raj institutions. It introduced a three-tier system of Panchayati Raj for all states having populations of over 2 million, to ensure decentralization of power to the grassroots level. This legislation marked a pivotal step in promoting local governance and democracy in rural India. Therefore, the correct answer is (c) 73rd Amendment Act.

S33. Ans.(b)
Sol. Sohan Singh Bhakna was the first president of the Ghadar Party, founded by Indians in the United States of America in 1913. The Ghadar Party was an organization founded by Punjabi immigrants in the USA and Canada with the aim of securing India's independence from British rule. It played a significant role in the Indian independence movement through its advocacy and armed resistance efforts. Therefore, the correct answer is (b) Ghadar Party

S34. Ans.(c)
Sol.

$$(cosec\ \theta - cot\ \theta)^2 = \frac{1-cos\theta}{A}$$

$$\left(\frac{1}{sin\theta} - \frac{cos\theta}{sin\theta}\right)^2 = \frac{1 - cos\theta}{A}$$

$$\left(\frac{1 - cos\theta}{sin\theta}\right)^2 = \frac{1 - cos\theta}{A}$$

$$\frac{1 - cos\theta}{sin^2\theta} = \frac{1}{A}$$

$$\frac{1 - cos\theta}{(1 - cos\theta)(1 + cos\theta)} = \frac{1}{A}$$
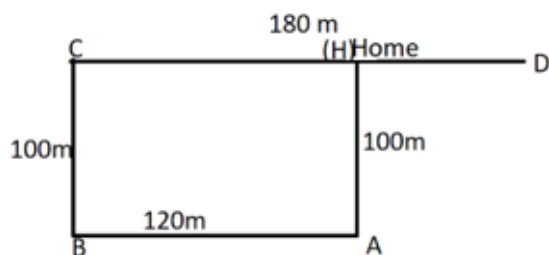
$$A = 1 + cos\theta$$

S35. Ans.(b)
Sol. Amna's sister age = 18
Aruna = 8+Amna's sister
Aruna = 8 + 18 = 26 years

S36. Ans.(d)
Sol.

CD = 180 m
AB = 120 m
So, HD = CD- AB = 180-120 = 60 m

S37. Ans.(d)
Sol.

$Total\ Surface\ Area\ =\ 2[lb+bh+hl]$
$Total\ Surface\ Area\ =\ 2[18.5 \times 12.5 + 12.5 \times 10 + 10 \times 18.5]$
TSA = Area has to be painted = 1082.5 cm^2

S38. Ans.(c)
Sol. India won 4 gold medals at the 14th International Olympiad on Astronomy and Astrophysics (IOAA) in 2021. Therefore, the correct answer is (c) 4

S39. Ans.(c)
Sol.

Let the original price of scooter be 100 unit
After repairing, Total Cost Price = 100+10% of 100 = 110 unit
120% of 110 = 132 unit
Profit = 2200
22 unit = 2200
1 unit = 100
10 unit spends on repair = Rs. 1000

S40. Ans.(a)
Sol. In Newlands' Octaves, which was an early attempt at organizing the elements based on increasing atomic weight, he proposed that elements with similar properties would appear every eighth element in the sequence. While this concept had limitations and was eventually superseded by the modern periodic table, it did hold true for some lighter elements.
Lithium (Li) and sodium (Na) are indeed located in the same octave in Newlands' table. They both belong to the alkali metal group and share similar properties, such as:
- Highly reactive metals that react readily with water to form strongly alkaline solutions.
- Low melting and boiling points.
- One valence electron in their outermost energy level.

S41. Ans.(d)
Sol. The correct answer is (d) 28 February
Rare Disease Day is acknowledged globally on the 28th of February (or 29th in leap years), symbolizing the "rareness" of the day itself. This day aims to raise awareness and support for the millions of individuals and families affected by rare diseases around the world.

S42. Ans.(b)
Sol.
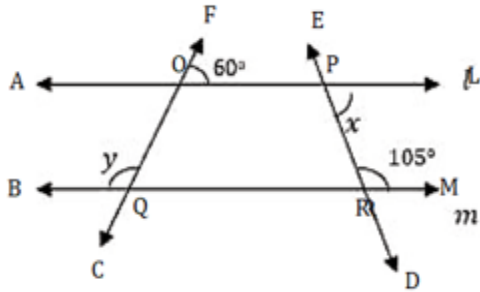
$\angle AOQ = \angle FOP = 60°$ (Vertically opposite angles)
By using interior angles theorem,
$\angle BQO + \angle AOQ = 180°$
$\angle BQO = 180° - 60° = 120°$
$\angle LPM + \angle PRM = 180°$
$\angle LPM + 108° = 180°$
$x = 75°$
$2x + y = 150° + 120° = 270°$

S43. Ans.(a)
Sol. Under the Pradhan Mantri Shram Yogi Maan-Dhan Yojana (PM-SYM) (Old Age Protection) as of July 2022, the monthly contribution payable by the beneficiary is 50% of the total contribution, with the government contributing the other 50%. This means the correct answer is (a) 50%

S44. Ans.(d)
Sol.
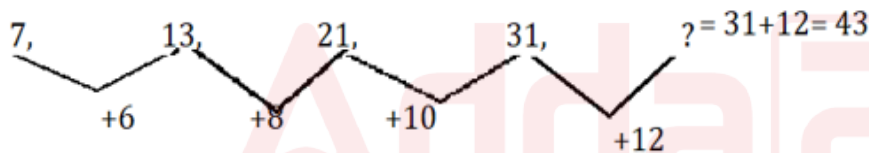
S45. Ans.(a)
Sol.
$6 \div 16 \times 4 \div 9 - 8 + 2 \times 7 = ?$
$6 + 16 - 4 + 9 \times 8 \div 2 - 7 = ?$
$22 - 4 + 36 - 7 = 58 - 11 = 47$

S46. Ans.(d)
Sol.

The Correct answer is (d) $3BaSO_4 + 2AlCl_3 \rightarrow 3BaCl_2 + Al_2(SO_4)_3$

S47. Ans.(c)
Sol. Opposite alphabets are coded here.
DIRTYING is coded as WRIGBRMT

S48. Ans.(c)

Sol. The bluish color of water in the deep sea is primarily due to the scattering of light. When sunlight enters the water, water molecules scatter the light in all directions. Blue light is scattered more than other colors because it travels as shorter, smaller waves. This is known as Rayleigh scattering, which is the same phenomenon that makes the sky look blue. Therefore, the correct option is (c) scattering of light

S49. Ans.(d)

Sol. The feature that says that people of India have a direct role in electing their representatives is (d) Parliamentary Form of Government

In the parliamentary form of government, as practiced in India, the public elects its representatives to the lower house of Parliament (the Lok Sabha at the national level and the Vidhan Sabha at the state level). These representatives are responsible for making laws and governing the country or state. This system ensures that the electorate has a direct role in choosing their leaders and representatives, who are accountable to them.

S50. Ans.(d)

Sol. The number which is divisible by 2 and 4, then it must be divisible by 8.

Among the given options, Only 32 is the answer that is divisible by 8.

S51. Ans.(a)

Sol. Steel Authority of India Limited (SAIL) was incorporated in the year 1973. So, the correct answer is (a) 1973.

S52. Ans.(c)

Sol.

Present Age of Shanthi and Keerthi be 7x and 3x.

After 5 years,

Age of Shanti = 40

7x+5 = 40

x=5

Keerthi age after 5 years = 3x+5 = $15 + 5 = 20 \ years$

S53. Ans.(a)

Sol.

Required decreased Percentage = $\frac{3-2.5}{3} \times 100 = 16.66\% \sim 17\%$

S54. Ans.(c)

Sol.

L@S*J^B<u>U#W</u> R<<u>E@N</u>S#B*H!<u>A&L</u><WQ

S55. Ans.(a)

Sol. The "Mango Showers" phenomenon in India is closely related to the pre-monsoon season, which occurs primarily in the late spring and early summer. These showers are crucial for the ripening of mangoes, hence the name "Mango Showers." They occur in several parts of India, particularly in the southern and northeastern regions, bringing much-needed relief from the intense heat of late spring and aiding in the agricultural process. Therefore, the correct answer to the given question is (a) Summer

S56. Ans.(c)

Sol. The Gosikhurd National Irrigation Project is related to (c) Maharashtra.

This project, also known as the Gosikhurd Dam, is on the Wainganga River near Pauni in Bhandara district, Maharashtra. It is one of the major irrigation projects in the state, aimed at providing irrigation benefits to the farmers of Nagpur, Bhandara, and Chandrapur districts. Additionally, the project includes provisions for hydroelectric power generation and water supply for industrial and domestic use.

S57. Ans.(b)

Sol. The need to balance chemical equations primarily serves to (b) To satisfy the law of conservation of mass.

The law of conservation of mass states that mass is neither created nor destroyed in a chemical reaction. Therefore, the mass of the reactants must equal the mass of the products. Balancing chemical equations ensures that the same number of atoms of each element is present on both sides of the equation, thus satisfying the law of conservation of mass. This is essential for accurately describing the quantitative relationships in chemical reactions.

S58. Ans.(c)

Sol. When ammonia solution is added to different solutions, the formation of a precipitate depends on the reaction of ammonia with the cation in the solution.

$Mg(NO_3)_2$ solution: Ammonia solution can react with magnesium ions to some extent, but it typically does not form a precipitate due to the solubility of magnesium hydroxide in the presence of an excess of ammonia, which forms a complex ion. However, the initial reaction might not be very pronounced in forming a visible precipitate compared to other reactions.

$Ba(NO_3)_2$ solution: Adding ammonia solution to barium nitrate does not result in the formation of a white precipitate because barium hydroxide, which could potentially form, is quite soluble in water. Ammonia does not form a complex with barium ions that would result in a precipitate.

$AlCl_3$ solution: Adding ammonia solution to aluminum chloride solution leads to the formation of a white precipitate of aluminum hydroxide, \text{Al(OH)_3}. This occurs because ammonia acts as a base, generating hydroxide ions that react with aluminum ions to form the insoluble aluminum hydroxide precipitate.

KNO_3 solution: Potassium nitrate solution reacting with ammonia does not form a precipitate. Potassium compounds are generally soluble in water, and ammonia does not form insoluble complexes with potassium ions.

Therefore, the correct answer is (c) $AlCl_3$ solution

S59. Ans.(c)

Sol. The correct answer is (c) Glucose, water, salts and amino acids

- Glucose, water, salts, and amino acids are all essential for the body's proper functioning. Filtering them out completely would be detrimental. Therefore, the kidneys selectively reabsorb them from the initial filtrate in the tubules.
- Proteins are large molecules and are not usually filtered through the glomerulus in healthy kidneys.
- Fats are generally not present in the blood in a form that can be filtered by the kidneys.

S60. Ans.(c)

Sol. Conclusion I. From the given statement we can conclude that F≤ Z. So, F< Z and F = Z can be the possibility. But there is no definite answer for F=Z. Conclusion I does not follow.

Conclusion II: From the given statement, we can conclude that E> B.

Hence, Only conclusion II is true.

S61. Ans.(d)
Sol.
Logic: Sum of alphabetical place value.
TRY = 20 + 18 + 25 = 63
NOT = 14 + 15 + 20 = 49
DUG = 4 + 21 + 7 = 32

S62. Ans.(a)
Sol. The major national festival celebrated every year to commemorate the enactment of the Constitution of India, which declared India to be a sovereign, democratic, and republic state, is on 26th January. This day is known as Republic Day. Hence, the correct option is (a) 26th January

S63. Ans.(c)
Sol. Bleaching powder, chemically known as calcium hypochlorite, has several uses due to its properties as a disinfectant and an oxidizing agent. Here's a brief overview of the applications mentioned:
(i) To make drinking water free from germs: This is a common use of bleaching powder due to its ability to kill bacteria and other pathogens, making water safe for drinking.
(ii) In soda-acid fire extinguishers: Historically, soda-acid fire extinguishers used a combination of sodium bicarbonate and sulfuric acid to generate a pressurized solution of carbon dioxide, which was used to extinguish fires. Bleaching powder is not used in this type of fire extinguisher.
(iii) As an oxidizing agent in many chemical industries: Bleaching powder serves as an effective oxidizing agent in various chemical processes, thanks to the presence of chlorine.
(iv) For baking cakes: Bleaching powder is not used in baking. Baking powder, which contains bicarbonate (baking soda) and an acid to react with it, is used in baking to help the dough rise, not bleaching powder.
Given these applications, the correct answer is:
(c) iv - For baking cakes

S64. Ans.(d)
Sol. The incorrect option among those listed for conserving soil is (d) Overgrazing
Overgrazing by livestock can lead to soil degradation by removing the vegetative cover that protects the soil from erosion, reducing the soil's moisture-holding capacity, and leading to compaction of the soil, which reduces its fertility and can increase runoff and erosion. Options (a) Crop rotation, (b) Planting trees, and (c) Terrace farming are all practices that help in conserving soil by improving its structure, reducing erosion, and enhancing its fertility.

S65. Ans.(b)
Sol.
The sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is $-\frac{b}{a}$.

On comparing the given quadratic equation, we get the value of b and a = 5

So, Sum of roots = $-\frac{b}{a}$

$9 = -\frac{b}{5}$
$b = -45$

S66. Ans.(d)
Sol. The contraceptive technique that increases phagocytosis of sperms within the uterus is (d) use of copper T. Copper T, also known as an intrauterine device (IUD) with copper, functions in several ways to prevent pregnancy. One of its primary mechanisms is to increase the phagocytosis of sperms in the uterus. The copper acts as a spermicide, killing sperms, and it also stimulates an inflammatory response in the uterus that enhances the phagocytosis (engulfing and digestion) of sperms by white blood cells. This makes it difficult for sperm to survive and fertilize an egg.

S67. Ans.(a)
Sol. Correct answer is (a) Temperature

The resistivity of most materials increases with temperature. As temperature rises, atoms vibrate more intensely, scattering free electrons and impeding their flow, leading to higher resistance. This dependence is typically expressed as a temperature coefficient of resistivity.

S68. Ans.(a)
Sol. To find where the image will be formed by a convex mirror, we can use the mirror equation:

$1/f = 1/v + 1/u$

Where:

- f is the focal length of the mirror,
- v is the image distance from the mirror (positive if the image is formed on the same side as the reflected light, which is always the case for a convex mirror), and
- u is the object distance from the mirror (negative if the object is in front of the mirror, which is the usual convention in mirror/lens equations).

Given that the focal length of the convex mirror is 2 m (for a convex mirror, this is taken as positive), and the bus is located at a distance of 3 m from the mirror, we take u=−3 m (since the object is in front of the mirror).

Substituting f=2 m and u=−3 m into the mirror equation:

$1/2 = 1/v - 1/3$

We can solve this equation for v to find the image distance from the mirror. Let's calculate it.

The image will be formed at a distance of approximately 1.2 m behind the mirror. Therefore, the correct answer is (a) 1.2 m behind the mirror.

S69. Ans.(d)
Sol.

(i) women academicians who are teachers = 19

ii) teachers who are doctors = 20

iii) men who are NEITHER teachers NOR academicians = 28

Sum of (i) , (ii),(iii) = 19+20 +28 = 67

S70. Ans.(d)
Sol. Guard cells are specialized cells in the epidermis of leaves, stems, and other organs that are involved in the regulation of gas exchange in plants. They function by opening and closing the stomata, which are small openings on the leaf surface. When the guard cells swell, they open the stomata, allowing for gas exchange: carbon dioxide can enter the leaf for photosynthesis, and oxygen and water vapor can exit. Conversely, when guard cells lose water and become flaccid, they close the stomata, reducing water loss through evaporation. Therefore, guard cells are directly involved in the process of transpiration, which is the evaporation of water from the plant's surface, primarily through the stomata.

So, the correct answer is (d) transpiration

S71. Ans.(a)
Sol. The rule used to determine the direction of induced current due to the motion of a coil at a right angle to the magnetic field is Fleming's Right-Hand Rule. This rule is specifically designed to find the direction of induced current when a conductor (such as a coil) moves in a magnetic field. According to Fleming's Right-Hand Rule, if you stretch the thumb, forefinger, and middle finger of your right hand so that they are all perpendicular to each other, with the thumb pointing in the direction of motion of the conductor, the forefinger pointing in the direction of the magnetic field, then the middle finger will point in the direction of the induced current.

Therefore, the correct answer is (a) Fleming's right-hand rule

S72. Ans.(a)

Sol.

Let x be the distance travelled by latter two hours.

Average Speed = $\frac{Total\ distance}{Total\ time}$

$30 = \frac{80+x}{3+2}$

$30 = \frac{80+x}{5}$

$x = 70\ km$

S73. Ans.(a)

Sol.

Logic: Number = Number $\times$ 2 $-$ 2

$8 : 14 = 8 \times 2 - 2 = 14$

$21 : ? = 21 \times 2 - 2 = 40$

S74. Ans.(d)

Sol. In March 2022, the Reserve Bank of India (RBI) directed Paytm Payments Bank to stop onboarding new customers. Therefore, the correct answer is (d) Paytm Payments Bank.

S75. Ans.(b)

Sol.

Let the cost price of a book be 100x unit

Selling Price = 100x - 14% of $100x = 86x\ unit$

ATQ

$86x + 100 = 100x \times \frac{106}{100}$

$20x = 100$

$x = 5$

Therefore, Cost Price of book = $100x = 100 \times 5 = Rs.\ 500$

S76. Ans.(b)

Sol.

14,   14,   17,   85,   92,   ? (828)

$\times 1$ $+3$ $\times 5$ $+7$ $\times 9$

S77. Ans.(a)

Sol.

$5 + x = 5 + 2 = 7$

$2x + 7 = 4 + 7 = 11$

$6x + 9 = 12 + 9 = 21$

When 5 + x, 2x + 7, 6x + 9, and y are in proportion

$\frac{7}{11} = \frac{21}{y}$

$y = 33$

S78. Ans.(d)
Sol.
$25 \times 35 - 5 + 7 \div 2 = ?$
$25 + 35 \div 5 - 7 \times 2$
$25 + 7 - 14 = 18$

S79. Ans.(a)
Sol.

Date	Singer
12th	Y
14th	V
16th	W
21st	Z
25th	X
31st	A

Z has his concert on 21st.

S80. Ans.(d)
Sol. The non-metallic character of elements typically increases as you move up a group in the periodic table. This is because the elements at the top of a group have a greater tendency to gain electrons (a key non-metallic property) due to their smaller size and higher electronegativity compared to elements lower in the group.
Group 16 of the periodic table consists of the chalcogens: Oxygen (O), Sulfur (S), Selenium (Se), Tellurium (Te), and Polonium (Po). Based on the trend mentioned, Oxygen (O), being the highest element in Group 16, exhibits the maximum non-metallic character among the options given.
Therefore, the correct answer is: (d) O

S81. Ans.(c)
Sol. By using the given statement:
(a) P > D: This cannot be determined from the given statement. We know that P > T and T > K, but the relationship between P and D is not directly given.
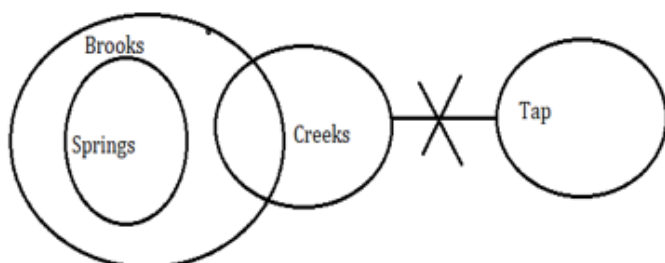(b) G ≥ D: Similar to option (a), the relationship between G and D is not directly given in the statement.
(c) G > T: From the statement, G is either greater than or equal to P, and P is greater than T. Hence, G must be greater than T.
(d) N > T: This cannot be concluded from the given statement. We know N = K and K > S, and S > T. However, we can't directly compare N and T.

S82. Ans.(b)
Sol.

Only conclusions III follow.

S83. Ans.(a)
Sol.
Number of odd days till 2011
 = No. of odd days in 2000 years (century leap year) + no. of odd days from 2001 to 2011
 = 0 odd days + (11 odd days + 2 odd days (as there are 2 leap years))
 = remainder of 13 ÷ 7 = 6
Number of odd days up to 10 January 2012 = remainder of 10 ÷ 7 = 3
Total odd days = 3+ 6 = 9 = remainder of 9 ÷ 7 = 2.

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Code	0	1	2	3	4	5	6

Hence, the day of the week on 10 January 2012 is Tuesday.

S84. Ans.(a)
Sol.
$x = 0.1\overline{6} = 0.16666$ ....(1)
Multiply by 10 and 100 in the equation (1)
$10x = 1.666$ ....(2)
$100x = 16.666$ ....(3)
Subtract 2 from 3
$90x = 15$
$x = \dfrac{1}{6}$
Similarly, $0.1\overline{5} = \dfrac{7}{45}$ and $0.1\overline{3} = \dfrac{2}{15}$
Now Solve, $\dfrac{1}{6} + \dfrac{7}{45} - \dfrac{2}{15} = \dfrac{15+14-12}{90} = \dfrac{17}{90}$

S85. Ans.(d)
Sol. The correct answer is (d) $AgNO_3$ and KBr.
- In a double displacement reaction, two ionic compounds exchange ions to form two new compounds.
- The equation you provided shows AgBr and KNO_3 as the products.
- For AgBr to form, we need a source of silver (Ag^+) and bromide (Br^-) ions.
- Similarly, for KNO_3 to form, we need a source of potassium (K^+) and nitrate (NO_3^-) ions.
- Option (d) - $AgNO_3$ and KBr - provides both sets of ions needed for the reaction:
    - $AgNO_3$ provides Ag^+ and NO_3^-.
    - KBr provides K^+ and Br^-.

S86. Ans.(c)
Sol. In India, direct taxes are those taxes that are levied directly on the income or wealth of individuals or organizations. Among the options provided:
- (a) Income Tax: This is a direct tax levied directly on the income of individuals and entities.
- (b) Corporate Tax: This is a direct tax levied on the net income of corporations and businesses.
- (d) Capital Gain Tax: This is a direct tax on the profit realized on the sale of a non-inventory asset that was greater than the amount realized on the sale.
However,
- (c) Excise Tax: This is considered an indirect tax because it is levied on the manufacture, sale, or consumption of goods within the country. The burden of this tax is passed on from the manufacturer to the consumer.

Therefore, the option that is NOT a direct tax in India is:
(c) Excise Tax

S87. Ans.(c)
Sol. KK Venugopal, the 15th Attorney General of India, received the first extension in his tenure in the year 2020. So, the correct answer is (c) 2020.

S88. Ans.(c)
Sol.
$a = 2x, b = 3x, c = 4x$
$a:b:c = 2x:3x:4x = 2:3:4$

S89. Ans.(b)
Sol. White blood cells (WBCs) have the ability to modify their shape. This is crucial for their function in the immune system, allowing them to move through the walls of blood vessels and into the tissues of the body to combat infections. This process is known as diapedesis. Thus, the correct answer is (b) WBC

S90. Ans.(b)
Sol. When a ray of light is incident on an interface separating two media along the normal to the interface, it means the incidence angle is 0° relative to the normal. According to Snell's Law, the refraction angle is calculated based on the indices of refraction of the two media and the sine of the incidence and refraction angles. However, when the light is incident normally (0° to the normal), it will not bend away from its path; it continues straight through the interface into the second medium without any deviation.
Therefore, the angle between the incident ray and the refracted ray, in this case, is 0°0°, because the refracted ray is along the same line as the incident ray.
So, the correct answer is: (b) 0°

S91. Ans.(d)
Sol.
Let x years ago, the age of Ram was three times as old as Sam.
$55 - x = 3(25 - x)$
$55 - x = 75 - 3x$
$2x = 20$
$x = 10 \ years$

S92. Ans.(a)
Sol.
Let the total work be 24 unit.
Efficiency of X = 3 unit per day
Efficiency of Y = 2 unit per day
Work done by both of them in 2 days = 5 unit
Work done by both of them in 8 days = 20 unit
Work done by X on 9th day = 3 unit
Time taken by Y to complete one unit work = $\frac{1}{2}$
So total days = $8 + 1 + \frac{1}{2} = 9\frac{1}{2}$

S93. Ans.(c)
Sol.
Let the value of x and y be 3a and 2a.
$$\frac{x^2 + y^2}{x^2 - y^2}$$
$$\frac{(3a)^2 + (2a)^2}{(3a)^2 - (2a)^2} = \frac{13a^2}{5a^2} = \frac{13}{5}$$

S94. Ans.(a)
Sol.
IInd Number = $(I\ number \times III\ number) + 1$
$(4, 25, 6)$
$25 = 4 \times 6 + 1$
Similarly, By using option (a)
We get,
$22 = 7 \times 3 + 1$

S95. Ans.(a)
Sol. The correct answer is (a) Both (a) and (b).
(a) Magnetic field lines can be parallel to each other. This situation is possible when the magnetic field is uniform. In a uniform magnetic field, the lines of force are parallel and equally spaced throughout the region. This is commonly observed in the space between the poles of a large electromagnet or the space around a straight conductor carrying current, far from its ends.
(b) Magnetic field lines can be concentric circles. This is observed around a straight current-carrying conductor, where the magnetic field lines form concentric circles around the conductor. The direction of these circles is given by the right-hand rule, and their centers lie on the axis of the conductor.
(c) Magnetic field lines cannot intersect each other. If they did, it would mean that at the point of intersection, the magnetic field would have two different directions, which is impossible. The direction of the magnetic field at any point in space is unique, indicating that magnetic field lines never intersect.
Therefore, the correct answer is (a) Both (a) and (b).

S96. Ans.(a)
Sol.
No. of girls passed in Physics= 135
No. of girls passes in Chemistry = 195
No. of girls passes in Biology = 165
Required Ratio= 9 : 13: 11

S97. Ans.(b)
Sol. In February 2022, the state of West Bengal launched the open-air classroom initiative named 'Paray Shikshalaya'. This initiative was aimed at resuming the academic activities that were halted due to the COVID-19 pandemic, especially targeting the primary level students to continue their education in an open-air environment, ensuring safety and adhering to COVID-19 protocols. So, the correct answer is (b) West Bengal
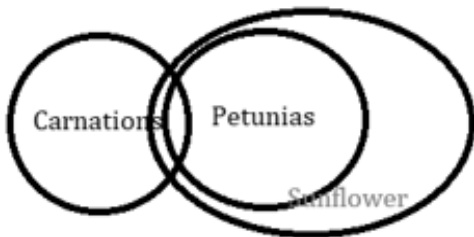
S98. Ans.(a)
Sol.

There are five consonants that are immediately preceded by a vowel and also immediately followed by a vowel.

S99. Ans.(b)
Sol. The prominent language spoken by 8.03% of the population of India as per the 2011 Census is Bengali (option b). Bengali is widely spoken in the eastern states of India, particularly West Bengal, as well as in the Andaman and Nicobar Islands. It is the second most spoken language in India after Hindi. Gujarati, Marathi, and Punjabi also have significant numbers of speakers but do not match the specific percentage mentioned for Bengali in the context of the 2011 Census.

S100. Ans.(c)
Sol.

Only conclusions I follows