PART-I

IQ (MENTAL ABILITY)

This section contains ***20 Multiple Choice Questions.*** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

1. A man said to a woman, "The only sister of your brother is my mother". How is that man related to that woman ?

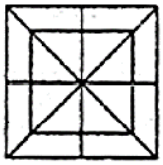
(1) Father (2) Son (3) Husband (4) Brother

2. If L denotes ×, M denotes ÷, P donetes + and Q denotes –, then

16 P 24 M 8 Q 6 M 2 L 3 = ?

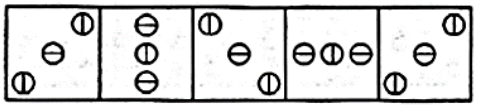
(1) $\frac{13}{6}$ (2) $-\frac{1}{6}$ (3) $14\frac{1}{2}$ (4) 10

3. How many triangles are there in the following figure ?

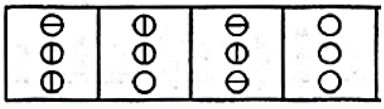


(1) 16 (2) 24 (3) 28 (4) 32

4. ***Directions :*** There are two sets of figures namely the Problem figures containing five figures a, b, c, d, e and the Answer figures (1), (2), (3), (4). Your have to select one figure from the answer figures which will continue the same series as given in the Problem figures.



a b c d e



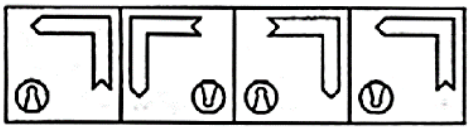
(1) (2) (3) (4)

5. If PRATAP could be given the code number 1618120116, what dode number can be given to NAVIN ?

(1) 14122914 (2) 19274651 (3) 24639125 (4) 73957614

6. ***Directions :*** In the following quesiton, choose the correct mirror image from alternatives (1), (2), (3), (4) of the figure (A).

(A)



(1) (2) (3) (4)

7. A girl leaves from her home. She first walks 30 metres in North-west direction and then 30 metres in South-west direction. Next, she walks 30 metres in South-east direction. Finally, she turns towards her house. In which direction is she moving ?
(1) North-east (2) North-west (3) South-east (4) South-west

8. ***Directions :*** Ninety one small cubes of same size are arranged in two cubes of sides 4 and 3 cm each. The bigger cube in coloured red on two opposite faces, white on two adjacent faces, and blue on the remaining faces while the smaller one is coloured white on two opposite faces, blue on two adjacent faces and red on the remaining faces. Taking both the cubes into consideration, answer the following question based on the above information.
How many cubes are not coloured on any of faces ?
(1) 1 (2) 4 (3) 8 (4) 9

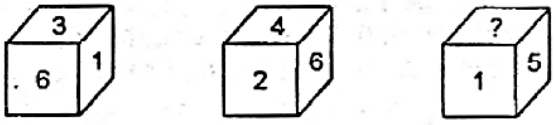
9. In the following series, how many such odd numbers are there which are divisible by 3 or 5, then followed by odd numbers and then also followed by even numbers ?
12, 19, 21, 3, 25, 18, 35, 20, 22, 21, 45, 46, 47, 48, 9, 50, 52, 54, 55, 56
(1) Nil (2) One (3) Two (4) Three

10. Study the following table and choose the alternative which can best replace the sign of interrogation (?)

1	2	3	2	10	12
2	5	12	10	16	13
1	2	1	?	10	24

(1) 5 (2) 11 (3) 13 (4) 8

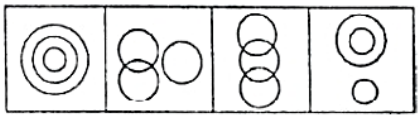
11. On the basis of the following figures, you have to tell which number will come in place of (?) ?



(i) (ii) (iii)

(1) 2 (2) 3 (3) 6 (4) 4

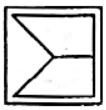
12. Which one of the following represents Musicians, Instrumentalists and Violinists ?


(1) (2) (3) (4)

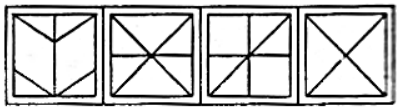
13. If A is the brother of B and K ; D is the mother of B and E is the father of A. Which one of the following statements is not definitely true ?
(1) A is the son of D (2) A is the father of K
(3) D is the wife of E (4) B is the brother of K

14. Find the missing number in the series.
25, 35, 34, 47, ? 59
(1) 57 (2) 43 (3) 46 (4) 56

15. In following question, choose the alternative figure in which the question figure (A) is embedded.



(A)



(1) (2) (3) (4)

16. Choose the alternative which shows the correct water-image of that word.

RADIANT

(1) TADIANR (2) TAꓠIANꓤ (3) TNAIDAR (4) ꓤAꓠIANT

17. Ram is to the South-East of Mukesh, Shyam is to the East of Mukesh and North-East of Ram. If Suresh is to the North of Ram and North-West of Shyam, in which direction of Mukesh is Suresh located ?

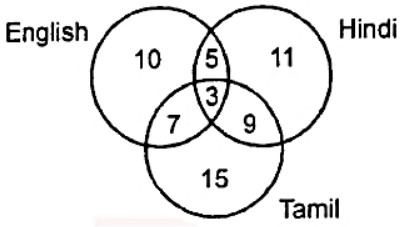
(1) North-West (2) South-West (3) North-East (4) South-East

18. Complete the series

aba_baca_ba_bacaabac_aca

(1) cacb (2) ccab (3) cabc (4) abcc

19. The numbers in different section of the overlapping circles indicate the number of people who speak different language. Answer the questions that follow.



How many cannot speak all the three languages ?

(1) 21 (2) 36 (3) 57 (4) 60

20. If 'WORD' is coded as 48 & "LETTER" is coded as 82 in a certain code language, then how will "SENTENCE" be coded in that language :

(1) 85 (2) 131 (3) 216 (4) 127

PART-II

SECTION-A : PHYSICS

This section contains ***15 Multiple Choice Questions.*** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

21. A stretching force of 10N is applied at both ends of a spring balance. The reading of spring balance is

(1) 10N (2) 20N (3) 5N (4) 40N

22. The ratio $\frac{g}{g_h}$ where g and g_h are the acceleration due to gravity at the surface of the earth and at a height h above the earth's surface respectively, is :

(1) $\left(1+\frac{h}{R}\right)^2$ (2) $\left(1+\frac{R}{h}\right)^2$ (3) $\left(\frac{R}{h}\right)^2$ (4) $\left(\frac{h}{R}\right)^2$

23. Drops of water fall from the roof of a building 9m high at regular intervals of time, the first drop reaching the ground at the same instant fourth drop starts to fall. What are the distances of the second and third drop from the roof? (Take $g = 10ms^{-2}$)

(1) 6m and 2m (2) 6m and 3m (3) 4m and 1m (4) 4m and 2m

24. If the density of earth increases by 20% and radius decreases by 20% then the new value of g on the surface of earth will be :

(1) 0.8 g (2) 0.9 g (3) 0.96 g (4) g

25. For hearing distinct echoes, the minimum distance of the obstacle from the source of sound must be (Given velocity of sound = 344 m/s) :

(1) 17.2 m (2) 34.4 m (3) 172 m (4) 344 m

26. Which of the following mirror is used in the vehicles to see the traffic coming from behind ?

(1) Plane (2) Convex (3) Concave (4) Cylindrical

27. A bomb of 50kg is fired from a cannon with velocity of $+600ms^{-1}$. If the mass of cannon is 1000kg, then magnitude of its its recoil velocity will be:

(1) $60ms^{-1}$ (2) $30ms^{-1}$ (3) $0.6ms^{-1}$ (4) $0.3ms^{-1}$

28. The area under acceleration-time graph represents

(1) displacement (2) velocity
(3) change in velocity (4) distance travelled

29. A lens which is thinner at the middle and thicker at the edges is called as :

(1) Convex lens (2) Concave lens (3) Cylindrical lens (4) None of these

30. A diwali rocket moves vertically up (from rest) with a constant acceleration $a_1 = \frac{20}{3} ms^{-2}$. After sometime its acceleration becomes $a_2 = 10\ ms^{-2}$ vertically downward due to gravity. If maximum height attained by rocket is 50 m, average speed of rocket for the complete motion is :

(1) 12 m/s (2) 15 m/s (3) 16.5 m/s (4) 10 m/s

31. Phases of the moon occur because

(1) we can see only that part of the moon which reflects light towards us.
(2) our distance from the moon keeps changing.
(3) the shadow of the Earth covers only a part of the moon's surface.
(4) the thickness of the moon's atmosphere is not constant.

32. When a particle moves in a circle with a uniform speed :
(1) Its velocity and acceleration are both constant
(2) Its velocity is constant but the acceleration changes
(3) Its acceleration is constant but the velocity changes
(4) Its velocity and acceleration both change

33. A body is dropped from a height h. If it acquires a momentum p, then the mass of the body is :

(1) $\frac{p}{\sqrt{2gh}}$ (2) $\frac{p^2}{2gh}$ (3) $\frac{2gh}{p}$ (4) $\sqrt{\frac{2gh}{p}}$

34. If displacement of a particle is zero, what can you conclude about its distance covered?
(1) It may or may not be zero (2) It cannot be zero
(3) It must be zero (4) can't say

35. ***Assertion :*** The time period of geostationary satellite is 24 hours.
Reason : Geostationary satellite must have the same time period as the time taken by the earth to complete one rotation about its axis.
(1) Both assertion and reason are correct and reason is the correct explanation of assertion
(2) Both assertion and reason are true but reason is not the correct explanation of assertion.
(3) Assertion is true but reason is false.
(4) Assertion is false but reason is true.

SECTION-B : CHEMISTRY

This section contains ***15 Multiple Choice Questions.*** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

36. A non-luminous flame is obtained when fuel is burnt
(1) Partially (2) Completely (3) Both (1) and (2) (4) None of these

37. Observe the following data of boiling points of the gases are

Gas	Nitrogen	Oxygen	Argon
B.P.	–196°C	–183°C	–186°C

Which gas can liquify first?
(1) Nitrogen (2) Argon (3) Oxygen (4) All of these

38. What is the percentage of carbon in coke?
(1) 90% (2) 25% (3) 98% (4) 75%

39. The amount of heat supplied to convert 100 gm of ice at 0°C to water at 0°C is _____ .
[latent heat of fusion of ice = 3.34×10^5 J/kg]
(1) 3.34×10^5 Joules (2) 2.25×10^5 Joules (3) 22.5×10^6 Joules (4) 33.4×10^3 Joules

40. The fuels which are available in direct form and can be burnt as such to release energy are known as
(1) Secondary fuels (2) Primary fuels (3) Tertiary fuels (4) None of these

41. Arrange the following in decreasing order of force of attraction between particles; iodine (violet solid), bromine (brown liquid), chlorine (greenish - yellow gas)

(1) Cl, Br, I

(2) I, Br, Cl

(3) Br, I, Cl

(4) All the three have equal intermolecular forces of attraction.

42. During the separation of two liquids by fractional distillation

(1) The component with lower melting point separates first

(2) The component with higher melting point separates first

(3) The component which is less volatile separates first

(4) The component which is more volatile separates first

43. Which of the following is an acidic oxide?

(1) Na_2O (2) Fe_2O_3 (3) SO_2 (4) N_2O

44. If a graph is plotted for melting of ice at 0^0C, in which temperature in ^0C is represented on y-axis while time of heating in minutes is represented on x-axis, then the graph shows

(1) A straight line perpendicular to x-axis (2) A straight line parallel to y-axis

(3) A straight line coincident with x-axis (4) A straight line coincident with y-axis

45. Which of the following does not cause green house effect?

(1) Water vapour (2) Aerosols (3) Methane (4) Nitrogen

46. An oxide of element 'X' is main cause of global warming. The element 'X' is

(1) Sulphur (2) Sodium (3) Carbon (4) Nitrogen

47. At higher altitudes

(1) Boiling point of a liquid increases (2) Boiling point of a liquid decreases

(3) No change in boiling point (4) None of these

48. Water gas is a mixture of

(1) $CO + N_2$ (2) $CO + CH_4$ (3) $CO_2 + H_2$ (4) $CO + H_2$

49. Pumice stone is an example of

(1) Gel (2) Emulsion (3) Solid sol (4) Solid Foam

50. The important disadvantage of CNG is that it

(1) Leaves residue (2) Is expensive

(3) Has low ignition temperature (4) Has low calorific value

SECTION-C : BIOLOGY

This section contains ***15 Multiple Choice Questions.*** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

51. Which one of the following is double membrane layered organelle?
(1) Mitochondria (2) Plastid
(3) Nucleus (4) All of these

52. Read the following statements regarding epithelial tissues and select which of them are true (T) and which of them are false (F).
(i) Epithelial tissue is protective tissue in animal body.
(ii) The lining of blood vessels, alveoli and kidney tubules are all made up of epithelial tissue.
(iii) Epithelial cells have a lot of intercellular spaces.
(iv) Epithelial tissues usually have no blood vessels.
(v) Epithelial tissues usually rest on a thin cellular basement membrane.
(1) (i)-F, (ii)-F, (iii)-T, (iv)-T, (v)-F (2) (i)-T, (ii)-F, (iii)-F, (iv)-F, (v)-F
(3) (i)-T, (ii)-T, (iii)-F, (iv)-F, (v)-T (4) (i)-T, (ii)-T, (iii)-F, (iv)-T, (v)-F

53. Species diversity is maximum in
(1) Tropical rain forest (2) Temperate forest
(3) Desert (4) Hill slopes

54. Which group of two cells shows similar kind of functions?
(1) Histiocytes and fibroblast (2) Basophils and Mast cells
(3) Acidophils and Basophils (4) Fibroblast and Mast cells

55. Select the common weedicide
(1) Water (2) 2, 4, – D
(3) Sodium benzoate (4) None of these

56. Hormone help in maintaining sugar level in body is
(1) Growth Hormone (2) Thyroxine
(3) Insulin (4) Adrenaline

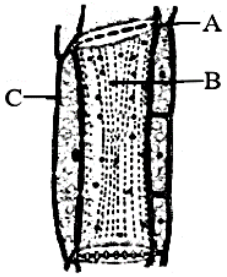
57. In which of the following method of irrigation rotating nozzles are used?
(1) Moat (2) Drip system
(3) Chain pump (4) Sprinkler system

58. Micro-organisms without cellular structure are
(1) Viruses (2) Bacteria (3) Algae (4) Protozoa

59. Method of plant breeding which involves production of HYV seeds
(1) Hybridisation (2) Selection (3) Introduction (4) None of these

60. Where reduction of carbon dioxide occurs in chloroplast?
(1) In stroma
(2) In thylakoids
(3) In stroma lamellae
(4) In inner mitochondrial membrane

61. Identify the given figure and select the correct option for the parts labelled as A, B, and C.



(1) C represents the cells which are replaced by albuminous cells in non-flowering plants such as gymnosperms.
(2) A represents phloem parenchyma, which provide mechanical strength
(3) B represents the cells which become dead on maturity.
(4) All of these

62. For movement of sperms, energy is provided by
(1) Head (2) Acrosome
(3) Tail (4) Middle piece

63. Which one of the following is not included under in situ conservation?
(1) Biosphere reserve (2) National Park
(3) Sanctuary (4) Botanical garden

64. Which one of the following is not a macronutrient required by plants?
(1) Nitrogen (2) Phosphorus (3) Iron (4) Potassium

65. Assertion : The Golgi apparatus mainly performs the function of packaging materials.
Reason : Materials to be packed in the form of vesicles from the ER fuse with trans face of the Golgi apparatus.
(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If both assertion and reason are false.

SECTION-D : MATHEMATICS

This section contains ***15 Multiple Choice Questions.*** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

66. Factorize $x(a-3)+y(3-a)$
(1) $(x-y)(a-3)$ (2) $(x+y)(a-3)$ (3) $(x-y)(3-a)$ (4) $(x+y)(3-a)$

67. $\sqrt{12}+\sqrt{3}$ is equal to

(1) $2\sqrt{6}$ (2) 6 (3) $3\sqrt{3}$ (4) $4\sqrt{6}$

68. $x = 5, y = 2$ is a solution of the linear equation

(1) $x + 2y = 7$ (2) $5x + 2y = 7$ (3) $x + y = 7$ (4) $5x + y = 7$

69. Three metal cubes whose edges are 6 cm, 8 cm and 10 cm respectively are melted to form a single cube. The edge of the new cube is :

(1) 12 cm (2) 24 cm (3) 18 cm (4) 20 cm

70. If 90% of x is 315 km, then the value of x is

(1) 325 km (2) 350 km (3) 350 m (4) 325 m

71. A number ending in 9 will have the unit place of its square as

(1) 3 (2) 9 (3) 1 (4) 6

72. If $a + b + c = 0$, then the value of $\frac{(b+c)^2}{bc}+\frac{(c+a)^2}{ac}+\frac{(a+b)^2}{ab}$ is

(1) 1 (2) 0 (3) 3 (4) –1

73. In which of the following quadrilateral diagonal bisect each other ?

(1) square (2) kite
(3) trapezium (4) both (1) and (2)

74. Factorize $x^4 + 25x^2 + 10x^3 - 36$:

(1) $(x + 2)(x + 3)(x - 6)(x - 1)$ (2) $(x + 2)(x - 3)(x + 1)(x - 6)$
(3) $(x + 2)(x + 3)(x - 1)(x + 6)$ (4) $(x - 2)(x - 3)(x - 1)(x - 6)$

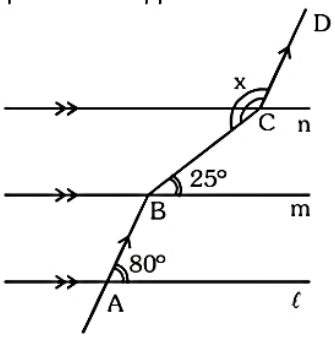
75. Which of the following number is a perfect cube ?

(1) 243 (2) 216 (3) 392 (4) 8640

76. Find the value of $10^{x/3+1}$, if $10^x = 64$

(1) 30 (2) 40 (3) 4 (4) 16

77. In given figure, $\ell \parallel m \parallel n$ and AB || CD find x



(1) 125° (2) 105° (3) 80° (4) 95°

78. Find total surface area of cube whose volume is 64 cm^3.

(1) 16 cm^2 (2) 64 cm^2 (3) 96 cm^2 (4) 128 cm^2

79. Simplify : $\frac{2^{3^4}}{(2^3)^4}$

(1) 1 (2) 69 (3) 2^{69} (4) None of these

80. Factorize : $3 + 23y - 8y^2$:

(1) $(1 - 8y)(3 + y)$ (2) $(1 + 8y)(3 - y)$

(3) $(1 - 8y)(y - 3)$ (4) $(8y - 1)(y + 3)$