



NARAYANA

GROUP OF SCHOOLS



Max. Time: 120 min

AARAMBH

Max. Marks: 320

Instructions:

- The test paper consists of **80** multiple choice questions numbered from **1 to 80**, each question followed by four alternatives 1, 2, 3 and 4.
- Mental Ability 1 to 20, Mathematics 21 to 35, Physics 36 to 50 and Chemistry 51 to 65, Biology 66 to 80.
- Each question has only one correct option.
- (a) Each correct answer carries **+4 Marks**.
(b) For each wrong answer **1 mark** will be **deducted**.

MAT (Q.NO.1 TO 20)1. **3,20,63,144,275 ?**

1) 354

2) 468

3) 548

4) 554

2. **ejo tyd ins xch ?**

1) nrw

2) mrw

3) msx

4) nsx

Directions (Questions 3-4): A code language has been used to write the words in capital letters in English in Column I as Greek letters in Column II. Greek letters in Column II do not appear in the same order as letters in Column I. Decode the language and choose the correct code for the word given in each question, from amongst the alternatives

Column I

CLEAR

VIEW

TURN

BUTTER

OILY

WRITE

VOWEL

Column II

γβωπθ

νεγδ

ηρπσ

σρασπγ

δλθμ

γπσνδ

νλεγθ

3. **LIVER**

1) υηλμπ

2) δγθπε

3) ρσωευ

4) αβδγη

4. **CYCLE**

1) βθγμβ

2) βμβυπ

3) πρπεω

4) πλβυπ

Directions (Q.No-5-7): A wooden cube is painted Blue on all the four adjoining sides and Green on two opposite sides i.e. top and bottom. It is then cut at equal distances at right angles four time vertically (top to bottom) and two times horizontally (along the sides).

5. How many cubes will have one face painted only in Blue?

- 1) 1 2) 2 3) 3 4) 4

6. How many cubes will have one face painted only in Green?

- 1) 1 2) 2 3) 3 4) 4

7. How many cubes are formed in all?

- 1) 16 2) 24 3) 27 4) 32

Directions (Questions 8-9): Read the following information carefully and answer the question given below.

(i) A, B,C,D,E,F and G are sitting around a circle and are facing the centre.

(ii) G is second to the left of C, who is to the immediate left of F

(iii) A is third to the left of E.

(iv) B is between D and E.

8. Which of the following is false?

- 1) A is fourth to the right of E. 2) G is to the immediate right of D.
3) F is third to the right of D. 4) B is to the immediate left of D.

9. Which of the following pairs has the first person sitting to the immediate left of the second person?

- 1) BE 2) CA 3) GD 4) DG

Directions: (10-11): Study the following information carefully and answer the questions given below:

All the roads of a city either perpendicular or parallel to one another. The roads are all straight. Roads A, B, C, D and E are parallel to one another. Roads G, H, I, J, K, L and M are parallel to one another.

(i) Road A is 1 km east of road B.

(ii) Road B is $\frac{1}{2}$ km west of road C.

(iii) Road D is 1 km west of road E.

(iv) Road G is $\frac{1}{2}$ km south of road H.

(v) Road I is 1 km north of road J.

(vi) Road K is $\frac{1}{2}$ km north of road L

(vii) Road K is 1 km south of road M

10. Which is necessarily true?

- 1) E and B intersect
- 2) D is 2 km west of B
- 3) D is at least 2 km west of A
- 4) M is 1.5 km north of L

11. If E is between B and C, which of the following is false?

- 1) D is 2 km west of A
- 2) C is less than 1.5 km from D.
- 3) Distance from E to B added to distance of E to C is $\frac{1}{2}$ km
- 4) E is less than 1 km from A

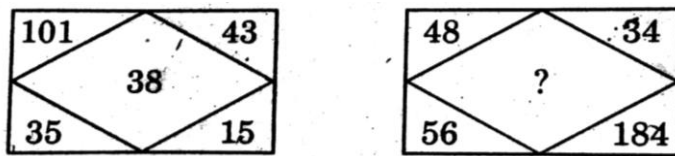
12. A clock is started at noon. By 10 minutes past 5, the hour hand has turned through:

- 1) 145°
- 2) 150°
- 3) 155°
- 4) 160°

13. If February 1, 2004 is Wednesday, what day is March 3, 2004?

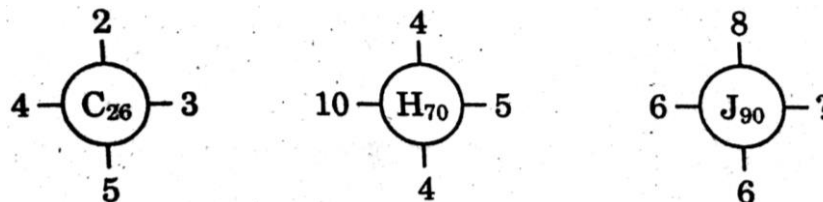
- 1) Monday
- 2) Sunday
- 3) Saturday
- 4) Friday

14.



- 1) 127
- 2) 142
- 3) 158
- 4) 198

15.



- 1) 17
- 2) 19
- 3) 4
- 4) 25

16. In each of the following questions two statements are given and these statements are followed by two conclusions numbered (1) and (2). You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts.

Give answer:

- (A) If only (1) conclusion follows
- (B) If only (2) conclusion follows
- (C) If either (1) or (2) follows
- (D) If neither (1) nor (2) follows and
- (E) If both (1) and (2) follow.

Statements: Some actors are singers. All the singers are dancers.

Conclusions:

Some actors are dancers.

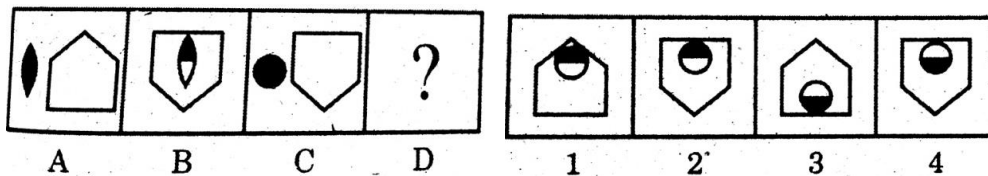
No singer is actor.

- 1) Only (1) conclusion follows
- 2) Only (2) conclusion follows
- 3) Either (1) or (2) follows
- 4) Neither (1) nor (2) follow

17. Three persons A, B and C are standing in a queue. There are five persons between A and B and eight persons between B and C. If there are three persons ahead of C and 21 behind A, then what could be the minimum and maximum number of persons in the queue?

- 1) 27, 36
- 2) 28, 40
- 3) 40, 81
- 4) 41, 96

18. Directions : Figure Analogy

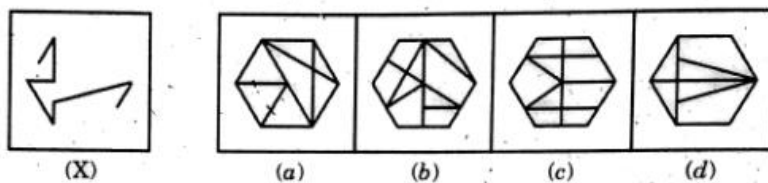


- 1) 1
- 2) 2
- 3) 3
- 4) 4

19. If $A+B > C+D$ and $B+C > A+D$, then it is definite that

- 1) $D > B$
- 2) $C > D$
- 3) $A > D$
- 4) $B > D$

20. Directions : Find out the Embedded figure (x)



- 1) a
- 2) b
- 3) c
- 4) d

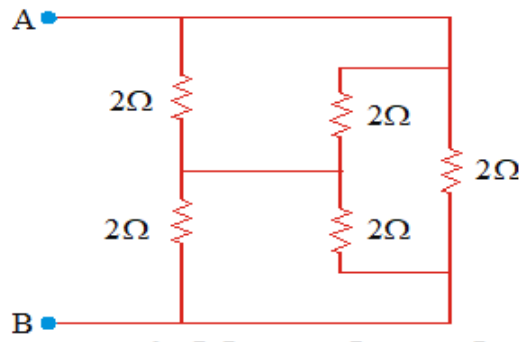
MATHEMATICS (Q.NO.21 TO 35)

21. Euclid divided his famous treatise 'The elements' into
 1) 13 chapters 2) 12 chapters 3) 11 chapters 4) 9 chapters
22. If the angles of a triangle are in the ratio 5:3:7, then the triangle is
 1) an acute angled triangle 2) an obtuse angled triangle
 3) a right angled triangle 4) an isosceles triangle
23. AD is a diameter of a circle and AB is a chord. If AD = 34cm, AB = 30cm, the distance of AB from the centre of the circle is
 1) 17cm 2) 15cm 3) 4cm 4) 8cm
24. The sides of a triangle are 56cm, 60cm and 52cm long. Then, the area of the triangle is
 1) 1322 cm^2 2) 1311 cm^2 3) 1344 cm^2 4) 1392 cm^2
25. The A.M of n observations is 'M' if the sum of (n-4) observations is 'a' then the mean of remaining 4 observations is _____
 1) $\frac{nM+a}{4}$ 2) $\frac{nM-a}{4}$ 3) $\frac{nM-a}{2}$ 4) $\frac{nM+a}{2}$
26. From an external point P to the circle with centre O tangents PA and PB are drawn touching the circle at A and B. If $\frac{1}{OA^2} + \frac{1}{PA^2} = \frac{1}{16}$. The length of the chord AB is _____
 1) 2 2) 4 3) 6 4) 8
27. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rectangle, if
 1) PQRS is a rectangle 2) PQRS is a parallelogram
 3) diagonals of PQRS perpendicular 4) diagonals of PQRS are equal
28. The value of $\frac{(2014^2 - 2020)(2014^2 + 4028 - 3)(2015)}{(2011)(2013)(2016)(2017)}$ is
 1) 2014 2) 2015 3) 2016 4) 2017
29. If $x^2 + bx + c$ has factor $x - 1$ and $x + 2$ then $b + c = \dots$
 1) 3 2) -3 3) 1 4) -1
30. Number of solutions of $2x - y = 7$ and $8x - 9y = 11$ is
 1) unique solution 2) finite solution
 3) infinite solution 4) no solution
31. In a triangle XYZ, if the internal bisector of $\angle X$ meets YZ in P, then
 1) $\frac{XY}{XZ} = \frac{YP}{PZ}$ 2) $\frac{XY}{PZ} = \frac{XZ}{PY}$ 3) $\frac{XY}{XZ} = \frac{PZ}{PY}$ 4) $\frac{XZ}{XY} = \frac{YP}{YZ}$
32. Two circles of radii 4cm and 5cm touch internally the distance between their centres is

- 1) 1 cm 2) 2 cm 3) 9 cm 4) 20 cm
33. The volume of the Right circular cylinder whose base radius is 14 cm and height 12 cm is _____ cm^3
- 1) 21566 2) 11476 3) 29126 4) 7392
34. The roots of $5x^2 - 7x + k = 0$ are $\sin A$ and $\cos A$, then the value of k is _____
- 1) $\frac{12}{5}$ 2) $\frac{49}{10}$ 3) 7 4) 1
35. Two integers x and y are chosen with replacement out of the set $\{0, 1, 2, 3, \dots, 10\}$ then the probability that $|x - y| > 5$ is _____
- 1) $\frac{81}{121}$ 2) $\frac{30}{121}$ 3) $\frac{25}{121}$ 4) $\frac{20}{121}$

PHYSICS (Q.NO.36 TO 50)

36. Find the equivalent resistance across AB:



- 1) $1\ \Omega$ 2) $2\ \Omega$ 3) $3\ \Omega$ 4) $4\ \Omega$
37. The amount of charge accumulated on the plates depends on nature of the ___ used in the battery.
- 1) Chemical 2) Anode 3) Cathode 4) All of these
38. The direction of electric field is from _____ terminal to _____ terminal in the conductor.
- 1) Positive, Negative 2) Negative, positive
3) Positive, Positive 4) Negative, Negative
39. An induction stove works on the principle of
- 1) Fleming's rule 2) Amperes' rule
3) Ohm's law 4) electromagnetic induction
40. An electric current passes through a long straight wire. At a distance 5 cm from the wire, the magnetic field is B . The field at 20 cm from the wire would be.

- 1) 2B 2) B/4 3) B/2 4) B

41. A device producing electric current is called:

- 1) generator 2) voltmeter 3) galvanometer 4) ammeter

42. A body moves on three quarters of a circle of radius r. the displacement and distance travelled by it are:

- 1) Displacement = r, distance = 3r 2) Displacement = $\sqrt{2}$ r, distance = $3\pi r/2$
 3) Distance = 2r, displacement = $3\pi r/2$ 4) Displacement = 0, distance = $3\pi r/2$

43. When the distance that an object travels is directly proportional to the length of time it is said to travel with

- 1) Zero velocity 2) Constant speed
 3) Constant acceleration 4) uniform velocity

44. Acceleration due to gravity on moon is 1/6 of the acceleration due to gravity on earth. If the ratio of densities of earth (ρ_m) and moon (ρ_e) is $\left(\frac{\rho_e}{\rho_m}\right) = \frac{5}{3}$ then radius of moon R_m in terms of R_e will be

- 1) $\frac{5}{18} R_e$ 2) $\frac{1}{6} R_e$ 3) $\frac{3}{18} R_e$ 4) $\frac{1}{2\sqrt{3}} R_e$

45. A planet has mass 1/10 of that of earth, while radius is 1/3 that of earth. If a person can throw a stone on earth surface to a height of 90m, then he will be able to throw the stone on that planet to a height

- 1) 90m 2) 40m 3) 100m 4) 45m

46. A block of mass 'm' is lowered with the help of a rope of negligible mass through a distance 'd' with an acceleration of g/3. Find the work done by the rope on the block?

- 1) $\frac{2mgd}{3}$ 2) $\frac{3mgd}{2}$ 3) $\frac{2mgd}{2}$ 4) $-\frac{2mgd}{3}$

47. If the velocity of a body is doubled its kinetic energy

- 1) gets doubled 2) becomes half
 3) does not change 4) becomes 4 times

48. Which part of human ear converts sound vibrations into electrical signals?

- 1) Hammer 2) Stirrup 3) Tympanic membrane 4) Cochlea

49. Speed of sound depends upon

- 1) Temperature of the medium
 2) Pressure of the medium
 3) Temperature of source producing sound
 4) Temperature and pressure of medium

50. Newton's second law of motion gives us a measure of:

- 1) Force 2) momentum 3) inertia 4) acceleration

CHEMISTRY (Q.NO.51 TO 65)

51. Dalton atomic theory could not include

- 1) Isotopes 2) Role of atom in chemical Reaction
3) Indivisible particles called atoms 4) All atoms of element have identical mass

52. The probability of finding an electron in an orbital is approximately

- 1) 50% 2) 60% 3) 70% 4) 95%

53. The radius of 1st Bohr's orbit in H-atom is

- 1) 52.9cm 2) 52.9 μ m 3) 52.9nm 4) 52.9pm

54. $C_xH_y + zO_2 \rightarrow xCO_2 + \frac{y}{2}H_2O$ $z = ?$

- 1) $x + \frac{y}{2}$ 2) $x + \frac{y}{4}$ 3) $\frac{x}{2} + y$ 4) $x - \frac{y}{4}$

55. Which of the following is not a precipitation reaction ?

- 1) $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$ 2) $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$
3) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ 4) $NaOH + HCl \rightarrow NaCl + H_2O$

56. Weight of $KClO_3$ required to produce as much oxygen as is required to burn 36 g of carbon partially is

- 1) 245 g 2) 250 g 3) 122.5 g 4) 144.5 g

57. A compound reacts with dil. HCl to produce effervescence of the gas evolved, extinguishes a burning of candle and turns lime water milky

- 1) $CaCO_3$ 2) $CaSO_4$
3) P_2O_5 4) $CaCl_2$

58. Henderson's equation is based on

- 1) Law of mass action 2) Law of conservation of mass
3) Law of definite proportions 4) Law of multiple proportion

59. The basicity of H_2SO_3 is

- 1) 1 2) 2 3) 3 4) 4

60. Which of the following is not correct?

$$1) \lambda = \frac{C}{\nu} \quad 2) h = \frac{E}{\nu} \quad 3) 1A^0 = 10^{-2} \text{ cm} \quad 4) E = mC^2$$

61. The number of electrons in any sub energy level can never exceed

$$1) n^2 \quad 2) 2n^2 \quad 3) (2l + 2) \quad 4) 2(2l + 1)$$

62. If λ_1 and λ_2 are the wave lengths of characteristic X-rays and gamma rays respectively, then the relation between them is :

$$1) \lambda_1 = \frac{\lambda_2}{2} \quad 2) \lambda_1 = \lambda_2 \quad 3) \lambda_1 > \lambda_2 \quad 4) \lambda_1 < \lambda_2$$

63. The chemical composition of Carnalite ore is



64. Arrange the following metals in the increasing order of their reactivity with oxygen
K, Fe, Pb and Cu.



65. The reaction occurring at cathode in electro-refining of copper is



BIOLOGY (Q.NO.66 TO 80)

66. Find out incorrect sentence

- 1) Protista includes unicellular eukaryotic organisms
- 2) Whittaker considered cell structure, mode and source of nutrition for classifying the organisms in five kingdoms
- 3) Both Monera and Protista may be autotrophic and heterotrophic
- 4) Monerans have well defined nucleus

67. Which among the following produce seeds?

- 1) Thallophyta
- 2) Bryophyta
- 3) Pteridophyta
- 4) Gymnosperms

68. Sustainable development means:

- 1) Prevention of wastage
- 2) Stable growth

- 3) Development without damaging 4) High yielding in less time

69. Listed below are four respiratory capacities (a - d) and four jumbled respiratory volumes of a normal human adult

Respiratory capacities	Respiratory volumes
(a) Residual volume	2500 ml
(b) Vital capacity	3500 ml
(c) Inspiratory reserve volume	1200 ml
(d) Inspiratory capacity	4500 ml

Which one of the following is the correct matching of two capacities and volumes?

- 1) (a) 4500ml ; (b) 3500ml
- 2) (b) 2500ml; (c) 4500ml
- 3) (c) 1200ml ; (d) 2500ml
- 4) (d) 3500ml ; (a)1200ml

70. Source of carbon for heterotrophs

- 1) Organic molecule 2) Inorganic molecule 3) Atmosphere 4) Animal

71. The most abundant plant pigment in the world

- 1) Chlorophyll-a 2) Chlorophyll-b 3) Xanthophylls 4) Carotenoid

72. Glomerular filtrate is:

- 1) Formed continuously by the process of ultrafiltration
- 2) The lipid free fluid collected within the lumen of Bowman's capsule
- 3) The protein free fluid collected within the lumen of Bowman's capsule
- 4) Formed by the process of selective reabsorption

73. Which one of the following pairs of the kind of cells and their secretion of correctly matched?

- 1) Oxyntic cells — A secretion with pH between 2.0 and 3.0
- 2) Alpha cells of islets of Langerhans — Secretion that decreases blood sugar level
- 3) Kupffer cells — A digestive enzyme that hydrolyses nucleic acids
- 4) Sebaceous glands — A secretion that evaporates for cooling

74. Epiglottis:

- 1) Diverts air to lungs
- 2) Diverts food mass away from opening of larynx
- 3) Prevents dust into the trachea

4) Prevents dust into the oesophagus

75. Internal respiration may be defined as:

- 1) Breathing in carbon dioxide and releasing of oxygen in the tissue
- 2) The oxidation of food substances to release energy
- 3) The building up (synthesis) of complex substances.
- 4) Getting rid of carbon dioxide that would accumulate in the tissues

76. The blood vessels that supply blood to the walls of the heart are

- | | |
|----------------------|---------------------|
| 1) Pulmonary vessels | 2) Coronary Vessels |
| 3) Pulmonary artery | 4) Renal vessels |

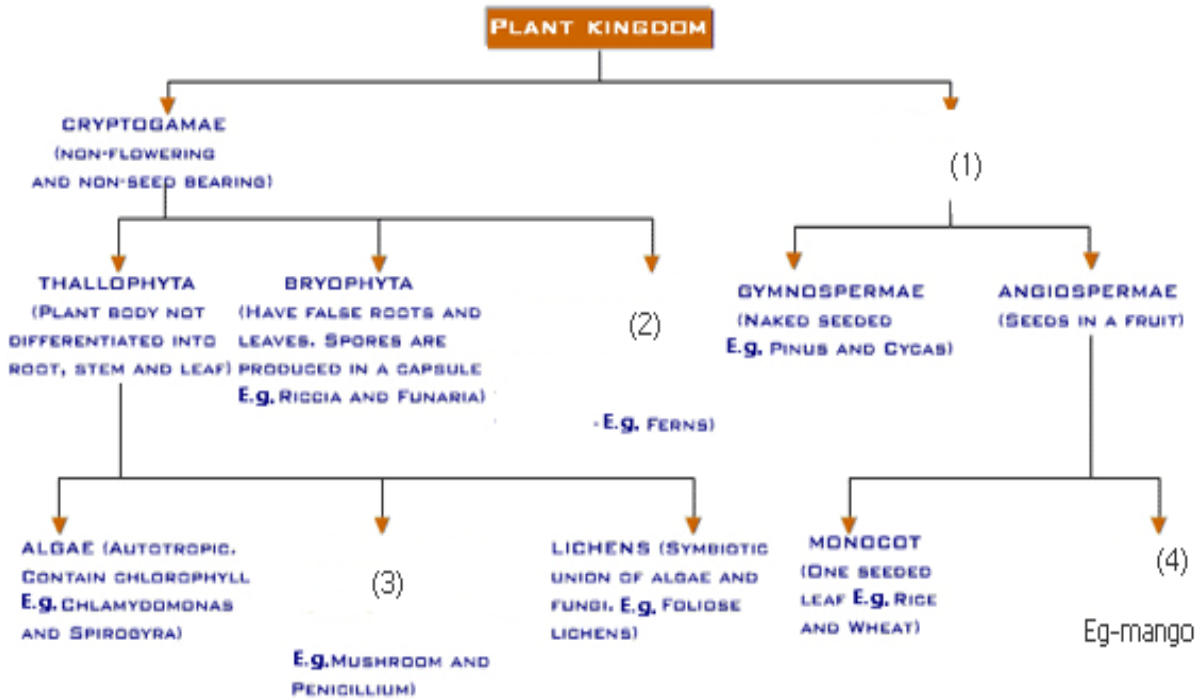
77. Who noticed by dissecting dead bodies of human beings that the valves in blood vessels are one-way valves?

- | | |
|---------------------|---------------------|
| 1) Girolamo Fabrici | 2) William Harvey |
| 3) Malphigi | 4) Andras Vessailus |

78. Which of the following are cerebral reflexes?

- i) A person on touching a warm object
 - ii) A person spits out immediately when a fly enters his mouth while talking.
 - iii) A person walking barefoot lifts his foot at once on stepping on to a nail
 - iv) A person's pupil contracts at once in the presence of bright light
- 1) (i) and (ii) 2) (ii) and (iii) 3) (iii) and (iv) 4) (ii) and (iv)

79. Name 1,2,3 & 4 in the chart



- 1) 1.Pteridophyta 2.Fungi 3.Dicot 4.Phanerogams
- 2) 1.Fungi 2. Dicot 3. Phanerogams 4. Pteridophyta
- 3.1.Phanerogams 2.Pteridophyta 3.Fungi 4.Dicot
- 4) 1. Pteridophyta 2. Phanerogams 3.Dicot 4. Fungi

80. Match List I with List II and choose the correct option

List I

- (a) Salivary amylase
- (b) Bile salts
- (c) Renin
- (d) Pepsin
- (e) Steapsin

List II

- (i) Proteins
- (ii) Milk proteins
- (iii) Starch
- (iv) Lipids
- (v) Emulsification of fats

- 1) a – iv, b – iii, c – ii, d – i, e – v
- 2) a – ii, b – iii, c – iv, d – v, e – i
- 3) a – ii, b – iv, c – iii, d – i, e – v
- 4) a – iii, b – v, c – ii, d – i, e – iv