NARAYANA GROUP OF SCHOOLS

Max. Time : 120 Min	AARAMBH	Max. Marks : 320

Instructions:

i. 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.

ii. Mental Ability 1 to 20, Mathematics 21 to 35, Physics 36 to 50 and Chemistry 51 to 65, Biology 66 to 80.

iii. Each question has only one correct option.

iv. (a) Each correct answer carries **+4 Marks**.
(b) For each wrong answer **1 mark** will be **deducted.**

MAT (Q.NO.1 TO 20)

Directions (Q.No : 1-2): Find the missing term in the given number series:

1. 5824, 5242,?, 4247,3823

1) 4467 2)4718 3) 4856 4) 5164

2. 240,?, 120,40,10,2

1) 180 2) 240 3) 420 4) 480

3. Find the missing term in the given letter series:

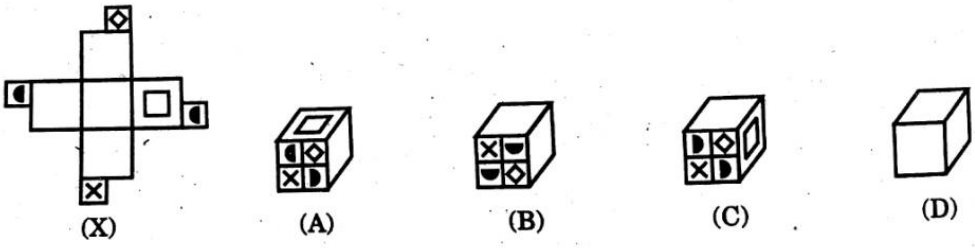
Q1F, S2E, U6D, W21C, ?

1) Y44B 2) Y66B 3) Y88B 4) Z88B

4. If RED is coded as 6720, then how would GREEN be coded?

1) 1677199 2) 1677209 3) 16717209 4) 9207716

5. Directions: The sheet of paper shown in the figure (X) Choose from amongst the alternatives the boxes that are similar to the box that will be formed.



1) A, B and C only 2) B and C only 3) A, C and D only 4) B, C and D only

6. Aman is 16th from the left end in a row of boys and Vivek is 18th from the right end. Gagan is 11th from Aman towards the right and 3rd from Vivek towards the right end. How many boys are there in the row?

1) 40 2) 42 3) 48 4) 41

Directions(Q. No :7-8) : Study the number series given below and answer the questions that follow:

A person is asked to put in a basket one apple when ordered 'One', one guava when ordered 'Two', one orange when ordered 'Three' and is asked to take out from the basket one apple and one guava both when ordered 'four'.

The order sequence executed by the person is as follows:

1 2 3 3 2 1 4 2 3 1 4 2 2 3 3 1 4 1 1 3 2 3 4

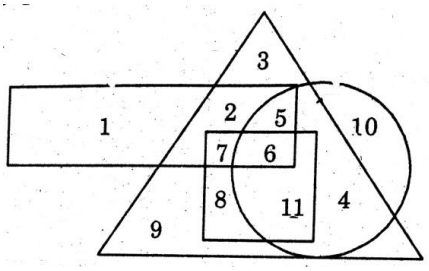
7. How many fruits will be there in the basket at the end of the above order sequence?

1) 10 2) 11 3) 12 4) 13

8. How many guavas will be there in the basket at the end of the above order sequence?

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

Directions (Q.No-9 to 10) : The following questions are based on the diagram given below.



1) The rectangle represents government employees.

2) The triangle represents urban people.

3) The circle represents graduates.

4) The square represents clerks.

9. Which of the following statements is true?

1) All government employees are clerks.

2) Some government employees are graduate as well as clerks.

3) All government employees are graduates.

4) All clerks are government employees but not graduates.

10. Choose the correct statement:

1) Some clerks are government employees.

2) No clerks in urban.

3) All graduates are urban.

4) All graduates are government employees.

11. A child is looking for his father. He went 90 metres in the east before turning to this right. He went 20 metres before turning to his right again to look for his father at his uncle's place 30 metres from this point. His father was not here. From there, he went 100 metres to his north before meeting his father in a street. How far did the son meet his father from the starting point?

1) 80 metres 2) 100 metres 3) 140 metres 4) 260 metres

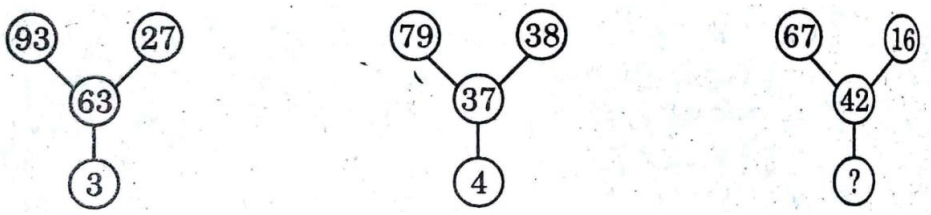
Directions (Q.No-12) : The below question, which one of the four interchanges in signs and numbers would make the given equation correct?

12. In an imaginary language, the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are substituted by a, b, c, d, e, f, g, h, i, and j. And 10 is Written as ba. THEN $(cd+ef)\times bc$ is equal to

1) 684 2) 816 3) 916 4) 1564

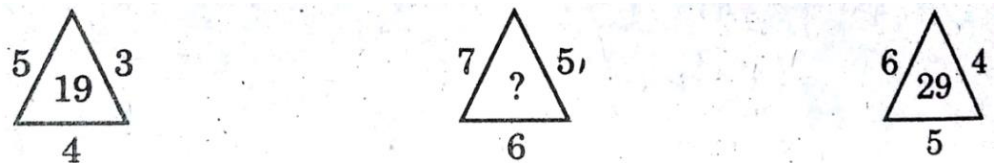
Directions (Q. No-13 to 14): Find the missing character from among the given alternatives.

13.



1) 5 2) 6 3) 8 4) 9

14.



1) 27 2) 33 3) 41 4) 47

Directions (Q. No-15) : Read the following information carefully and

answer the question given below:

i) '$P\times Q$' **means 'P is the father of Q';**

ii) '$P-Q$' **means 'P is the sister of Q';**

iii) '$P+Q$' **means 'P is the mother of Q';**

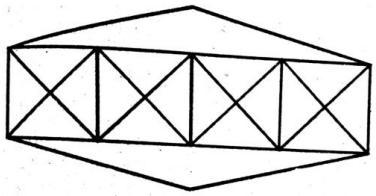
iv) '$P\div Q$' **means 'P is the brother of Q';**

15. Which of the following represents 'R' is niece of M'?

1) $M \div K \times T - R$ 2) $M - J + R - N$
3) $R - M \times T \div W$ 4) cannot be determined

Directions (Q.No-16) : Count the number of squares and triangles in the following figures

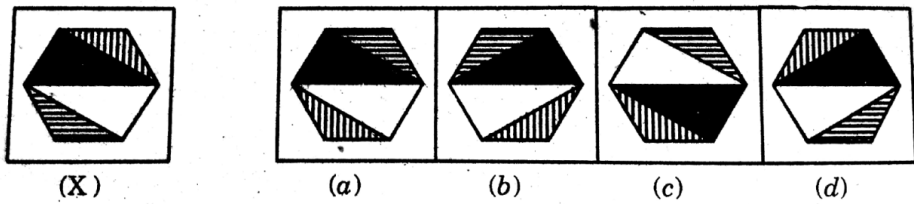
16.



1)36 triangles, 7 squares 2) 38 triangles, 9 squares

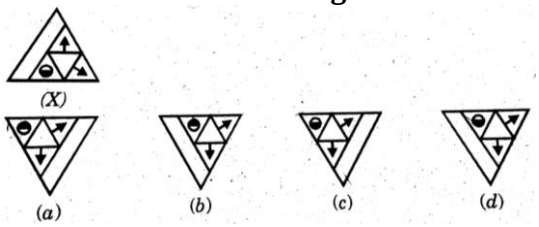
3) 40 triangles, 7 squares 4) 42 triangles, 9 squares

17. Directions : Mirror Images



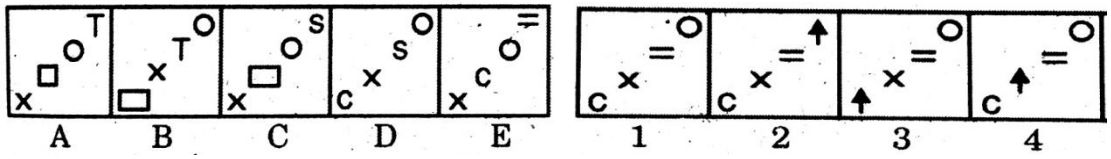
1) a 2) b 3) c 4) d

18. Directions : Water Images



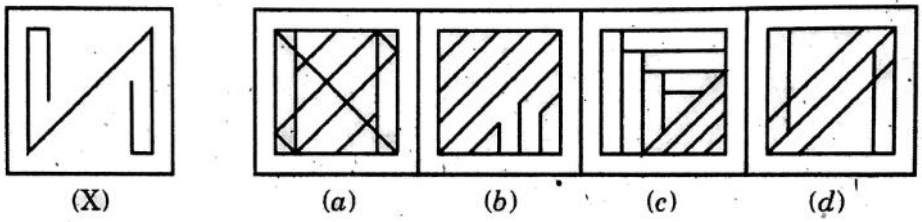
1) a 2) b 3) c 4) d

19. Directions : Figure Series



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

20. Directions : Embedded Figure



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

MATHEMATICS (Q.NO.21 TO 35)

21. **The value of** $\sqrt{10+\sqrt{25+\sqrt{108+\sqrt{154+\sqrt{225}}}}}$ **is:**

1) 4 2) 6 3) 8 4) 10

22. $\sqrt[3]{4\frac{12}{125}} = ?$

1) $1\frac{2}{5}$ 2) $1\frac{3}{5}$ 3) $1\frac{4}{5}$ 4) $2\frac{2}{5}$

23. **Which of the following expressions are exactly equal in value?**

i) $(3x-y)^2-(5x^2-2xy)$

ii) $(2x-y)^2$

iii) $(2x+y)^2-2xy$

iv) $(2x+3y)^2-8y(2x+y)$

1) i and ii only 2) i, ii and iii only 3) ii and iv only 4) i, ii and iv only

24. $\left(\left((625)^{\frac{-1}{2}}\right)^{\frac{-1}{4}}\right)^2 =$ _____

1) 4 2) 5 3) 2 4) 3

25. **Factorise:** $ab(c^2+1)+c(a^2+b^2)$

1) $(ab+c)(a+bc)$ 2) $(ac+b)(ab+c)$ 3) $(a+bc)(ac+b)$ 4) $(a+b)(ac+b)$

26. **The solution of** $\frac{2x+3}{2x-1}=\frac{3x-1}{3x+1}$ **is**

1) $\frac{1}{8}$ 2) $\frac{-1}{8}$ 3) $\frac{8}{3}$ 4) $\frac{-8}{3}$

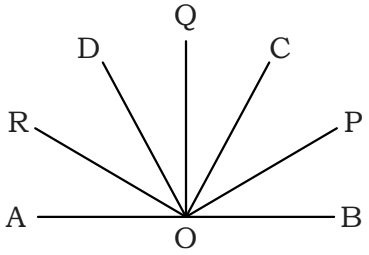
27. **If the length and width of a rectangular garden plot were each increased by 20 present, then what would be the percent increase in the area of the plot?**

1) 20% 2) 24% 3) 36% 4) 44%

28. **HCF of the polynomials** $20x^2y(x^2-y^2)$ **and** $35xy^2(x-y)$ **is:**

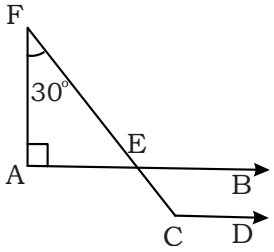
1) $5x^2y^2(x-y)$ 2) $5xy(x-y)$ 3) $5x^2y^2(x+y)$ 4) $5xy(x^2-y^2)$

29. **If $\angle BOC : \angle COD : \angle AOD = 4:2:3$, where OP, OQ, OR are bisectors of angles $\angle BOC, \angle COD$ and $\angle AOD$, then $\angle POR$ is**



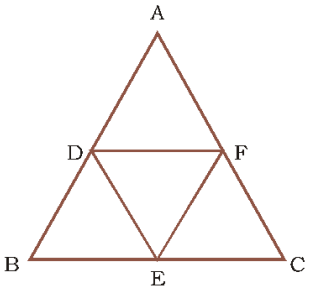
1) 130^o 2) 180^o 3) 140^o 4) 110^o

30. **In the figure given below, $AB \| CD$ and $\angle F = 30^o$. Then $\angle ECD$ is**



1) 130^o 2) 120^o 3) 150^o 4) 60^o

31. **Triangle formed by joining the midpoints of equal sides of an isosceles triangle is**



1) Isosceles 2) equilateral 3) scalene 4) Right

32. **In a laboratory the count of bacteria in a certain experiment was increasing at the rate of 2.5% per hour, then the bacteria at the end of 2 hours if the count was initially Rs 5,06,000 is**

1) 531616 2) 531606 3) 541606 4) 556160

33. **If 14 typists typing 6 hours a day can take 12 days to complete the manuscript of a book, then how many days will 4 typists, working 7 hours a day, can take to do the same job?**

1) 36 days 2) 34 days 3) 32 days 4) 30 days

34. **ABCD is a parallelogram; AC and BD are diagonals intersect at O. If OA = 9cm, then OC is**

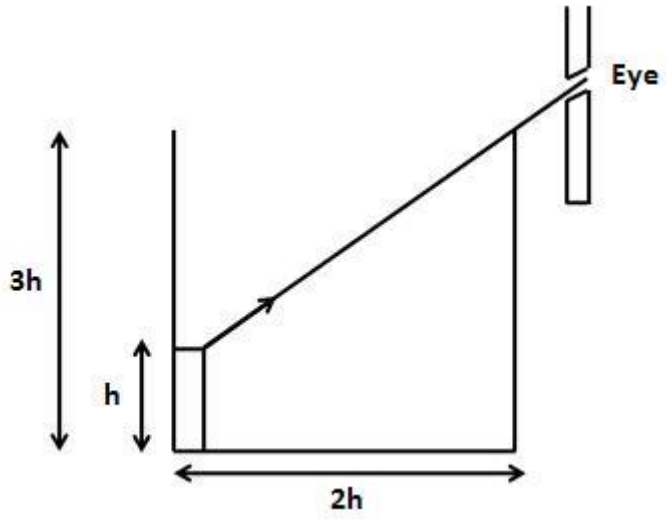
1) 4cm 2) 3cm 3) 5cm 4) 9cm

35. **If the remainder obtained by subtracting a number from its own square is 4 times the number, what is the number?**

1) 4 2) 3 3) 6 4)5

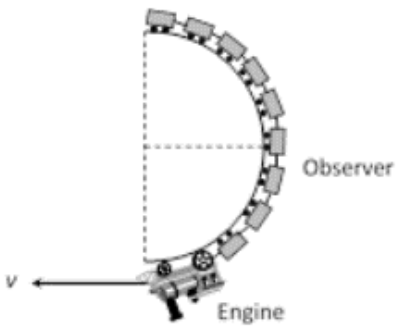
PHYSICS (Q.NO.36 TO 50)

36. **An observer can see through a pin hole the top end of a thin rod of height h, placed as shown in the figure. The beaker height is 3h and its radius h. When the beaker is filled with a liquid up to a height 2h, he can see the lower end of the rod. The refractive index of the liquid is (Figure not to scale).**



1) $\frac{5}{2}$ 2) $\sqrt{\frac{5}{2}}$ 3) $\sqrt{\frac{3}{2}}$ 4) $\frac{3}{2}$

37. **A train has just complicated a U-curve in a track which is a semicircle. The engine is at the forward end of the semi-circular part of the track while the last carriage is at the rear end of the semi-circular track. The driver blows a whistle of frequency 200 Hz. Velocity of sound is 340 m/sec. Then the apparent frequency as observed by a passenger in the middle of a train when the speed of the train is 30 m/sec is**



1) 209 Hz 2) 288 Hz 3) 200 Hz 4) 181 Hz

38. The tilting of the earth is responsible for

1) Change of days 2) Change of the sun's rays
3) Change of the season 4) None

39. A particle moves in a straight line with acceleration described by equation given below $a = mx - \frac{v_0^2}{x_0}$. If the initial velocity and displacement are $(v_{0,}\, 0)$ and at any time t_0 velocity and displacement are $(0, x_0)$ the value of constant m is

1) $\frac{v_0^2}{x_0^2}$ 2) $-\frac{v_0^2}{x_0^2}$ 3) $\frac{2v_0^2}{x_0^2}$ 4) $-\frac{2v_0^2}{x_0^2}$

40. A man getting down a running bus falls forward because

1) Due to inertia of rest, road is left behind and man reaches forward

2) Due to inertia of motion upper part of body continues to be in motion in forward direction while feet come to rest as soon as they touch the road

3) He leans forward as a matter of habit

4) Of the combined effect of all the three factors stated

41. 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) $\frac{1}{2\sqrt{3}}R_e$

42. The sharpness of television image is termed as its

1) Clarity 2) colour 3) resolution 4) graphics

43. Voice box or larynx of human process

1) Sound 2) Wind 3) Loudness 4) None

44. What will be the effect of temperature on speed of sound?

1) The speed of sound decreases with the increases of temperature of the medium.

2) The speed of sound decreases with the decrease of temperature of the medium.

3) The speed of sound increases with the decrease of temperature of the medium.

4) The speed of sound increases with the increase of temperature of the medium.

45. Which is the brightest star in the night sky?

1) Sirius 2) Vega 3) Alpha Centauri 4) Proxima Centauri

46. The different group of stars is known as

1) Constellations 2) Celestial bodies 3) Asteroids 4) Comet

47. In the case of a rectilinear uniform motion, distance-time graph is a

1) Parabola 2) straight line 3) curved line 4) rectangle

48. A solid ball, a cylinder, and a hollow ball all have the same mass m and radius R. They are allowed to roll down a hill of height H without slipping. How fast will each be moving on the level ground?

1) $\sqrt{\frac{2mgH}{m+\frac{1}{R^2}}}$ 2) $\sqrt{\frac{8mgH}{m+\frac{1}{R^2}}}$ 3) $\sqrt{\frac{2mgH}{1+\frac{m}{R^2}}}$ 4) $\sqrt{\frac{2mg}{m+\frac{1}{R^2}}}$

49. A boy sitting on the topmost berth in the compartment of a train which is just going to stop on a railway station, drops an apple aiming at the open hand of his brother sitting vertically below his hands at a distance of about 2 meter. The apple will fall

1) Precisely on the hand of his brother

2) Slightly away from the hand of his brother in the direction of motion of the train

3) Slightly away from the hand of his brother in the direction opposite to the direction of motion of the train

4) None of the above

50. This test paper is sitting at rest on your desk. Which of the following statements best describes this situation?

1) There are no forces acting on your paper.

2) Your paper pushes on the desk only.

3) The desk pushes on your paper only

4) The forces acting on the paper are balanced.

CHEMISTRY (Q.NO.51 TO 65)

51. Coal is of

1) 3-types 2) 4-types 3) 1-type 4) 2-types

52. The type of combustion in which material burns rapidly and produces heat and light is called_____

1) Rapid combustion 2) Not a combustion

3) Very slow combustion 4) None of these

53. The physical state of water in the polar ice caps and glaciers is

1) Liquid 2) Gas 3) Solid 4) None of these

54. Which of the following is a basic oxide?

1) Na_2O 2) SO_2 3) NO_2 4) ClO_2

55. In a _____ mixture the components of mixture are uniformly distributed, throughout it.

1) Heterogeneous mixture 2) Homogeneous mixture
3) Solid mixture 4) Suspensions

56. Bauxite is

1) $Al_2O_3.2H_2O$ 2) $MgCO_3$ 3) $CaCO_3$ 4. ZnS

57. The metal present in haemoglobin is

1) Mg 2) Co 3) Cu 4) Fe

58. Example of Heterogeneous mixture

1) Naphthalene & Water 2) Salt & Water
3) Sugar & Water 4). Alcohol & Water

59. During the formation of coal, which form of the coal is formed at last

1) Peat 2) Anthracite 3) Lignite 4) Bituminous

60. The amount of heat energy produced on complete combustion of 1kg of fuel is called the _____ of that fuel.

1) Calorific value 2) Isothermic value 3) capacity 4) None of these

61. Tincture of Iodine which is used as an antiseptic is a/an

1) Compound 2) Pure substance 3) Mixture 4) Element

62. In which zone of the candle flame vaporized wax complete combustion takes place due to good supply of air?

1) Yellow 2) Red 3) Blue 4) outside the zone

63. The Homogeneous mixture of two or more substances from which we cannot separate its components by the process of filtration is called a _____

1) Solution 2) Solvent 3) Solute 4) All of these

64. Which one of the following is used for making shoe polish?

1) Paraffin wax 2) petrol 3) diesel 4) lubricating oil

65. Among the following which metal form super oxide?

1) Na 2) K 3) Mg 4) Zn

BIOLOGY (Q.NO.66 TO 80)

66. Red Data Book is published by:-

1) WWP 2) IUCN 3) UNO 4) BSI

67. Part of earth which supports the biodiversity is called

1) Biosphere 2) Sanctuary 3) Ecosystem reserve 4) Biotic community

68. The species which are at the verge of the extinction

1) Endemic 2) Extinct 3) Endangered 4) Exotic

69. 2 - 4D is a

1) Pesticides 2) Insecticides 3) Fungicides 4) Weedicides.

70. Match the microorganisms given in the Column A to the group to which they belong in Column B

Column A	Column B
(a) *Lactobacillus*	(i) Algae
(b) Aspergillus	(ii) Protozoa
(c) Spirogyra	(iii) Fungi
(d) Paramecium	(iv) Bacteria

1) a-iv, b-iii, c-i.ii 2) a-iv, b-iii, c-ii.i 3) a-iv, b-ii, c-i.iii 4) a-ii, b-iv, c-i.ii

71. BCG vaccination can prevent

1) Cholera 2) tuberculosis 3) hepatitis 4) HIV

72. Which of the following statements about reproduction in humans is correct?

1) Fertilisation takes place externally.

2) Fertilisation takes place in the testes.

3) During fertilisation egg moves towards the sperm.

4) Fertilisation takes place in the human female.

73. In human beings, the correct sequence of events during reproduction is

1) Gamete formation, fertilisation, zygote, embryo

2) Embryo, zygote, fertilisation, gamete formation

3) Fertilisation, gamete formation, embryo, zygote

4) Gamete formation, fertilisation, embryo, zygote

74. Which of the following is true regarding colourless plastid of the cell?

1) Chloroplasts performs photosynthesis

2) Leucoplasts performs respiration

3) Chromoplasts are involved with protection from sunlight

4) Leucoplasts help in the storage of Food

75. An animal cell, a plant cell and a bacterium share the following structural features:

1) Cell membrane, endoplasmic reticulum, vacuoles

2) Cell wall, plasma membrane, mitochondria

3) Cell wall, nucleus, cytoplasm

4) Plasma membrane, cytoplasm, ribosomes

76. Match the following

Column – A	Column – B
(a) Electric impulse	(i) Skin
(b) Filling of space inside the organs	(ii) Cartilage
(c) Adipose tissue	(iii) Areolar tissue
(d) Surface of joints	(iv) Nervous tissue
(e) Stratified squamous epithelium	(v) Subcutaneous layer

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

77. Synthesis, packaging and movement of proteins in the cells take place in the following organelles respectively

1) Ribosomes →Endoplasmic reticulum → Golgi bodies
2) Golgi bodies →Endoplasmic reticulum → Ribosomes
3) Endoplasmic reticulum → Golgi bodies → Ribosomes
4) Ribosomes → Golgi bodies →Endoplasmic reticulum

78. Jersey and Brown Swiss are

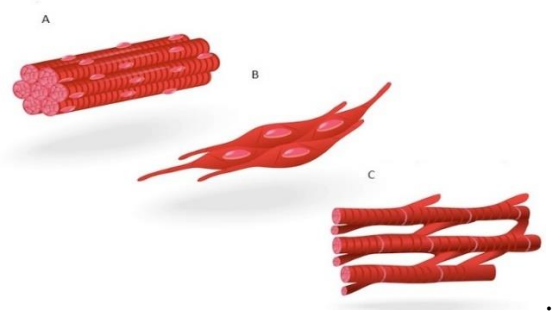
1) Exotic breeds of cattle having short lactation periods
2) Exotic breeds of cattle having longer lactation periods
3) Desi (Local) breeds of cattle having longer lactation periods
4) Desi (Local) breeds of cattle having short lactation periods

79. What are the desired agronomic characters for fodder and cereal crops they would opt for?

a) Tallness desired in cereal crops.
b) Profuse branching for fodder crops
c) Variety resistance to biotic stress a good factor to improve crops
d) Shorter duration of crops from sowing to harvesting

1) a, b,& c 2) b & c 3) b, c & d 4) a, b, c

80. Given below are figures of three kinds of muscle fibres, which one/ones would you find in our legs?



1) A only 2) B only 3) A and C 4) B and C

****ALL THE BEST******

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