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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION - 2011

SOLUTIONS FOR CLASS : 6

Mathematics

1. (D) The positive whole numbers less than 1000 that end with 77 are 77, 177, 277, 377, 477, 577, 677, 777, 877, 977.

Begin with 77 are : 77, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779.

$\therefore$ 10 in first and 11 in the second list

$\therefore$ 10 + 11 – 2 = 19

2. (C) Since the perimeter of the square is 48, its side length is $48 \div 4 = 12$.

Since the side length of the square is 12, its area is $12 \times 12 = 144$.

The area of the triangle is $\frac{1}{2} \times 48 \times x = 24x$

Since the area of the triangle equals the area of the square, then

$24x = 144$

$x = 6$

3. (D) P = 7, Q = 6, R = 4

$$\begin{array}{r} 776 \\ \times\quad 6 \\ \hline 4656 \end{array}$$

P + Q + R = 17

4. (D) Between x a.m. and x p.m there are 12 hours. Therefore, Mr. Z works for 12 hours on saturday.

5. (A) $5x + 8x = 91$

$13x = 91$

$x = 7$

$8 \times 7 = 56$; $5 \times 7 = 35$

$56 - 35 = 21$

6. (D) RS is the line parallel to PQ.

7. (D) 6 odd numbered rows (1, 3, 5, 7, 9, 11)

i.e., $6 \times 15 = 90$ seats

5 even numbered rows (2, 4, 6, 8,10)

i.e. $5 \times 16 = 80$ seats

Total seats = 90 + 80 = 170

8. (B) 0.2 is the largest

9. (A) $485 \text{ m} = \frac{485}{1000} = 0.485 \text{ km}$

Total distance = 3 + 0.485 km

= 3.485 km

10. (C) We make a chart of the pairs of positive integers which sum to 11.

1st (Z)	2nd (Z)	Product
1	10	10
2	9	18
3	8	24
4	7	28
5	6	30

So the greatest possible product is 30.

11. (C) $P + Q = 1000.01$

$P \times Q = 10$

$\frac{P}{Q} = 100000$

$\frac{Q}{P} = 0.00001$

$P - Q = 999.99$

$\therefore \frac{P}{Q}$ is the largest

12. (D) Sum of opposite angles of a parallelogram is 180^0

$180 - 124 = 56^0$

13. (B) Clearly, from options $\frac{\cancel{24}}{2} : \frac{\cancel{36}}{3}$

2 : 3

$\therefore$ 24 boys and 36 girls.

14. (A) Since the ratio of the number of big dogs to small dogs is 3 : 17

$\Rightarrow$ There are 3 large dogs in each group of 20.

Since there are 80 dogs, there are four groups of 20. This means that there are 3×4 or 12 large dogs.

15. (B) Area of shaded part

$$= 28 \times 18 - \left[[28 - (9 + 5)] \times 6\right]$$

$$= 504 - 84$$

$$= 420 \text{ cm}^2$$

16. (B) 0 is an integer.

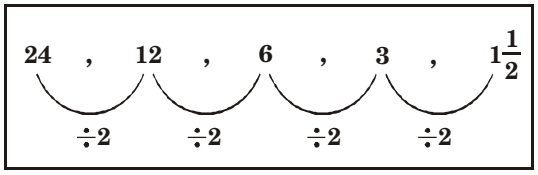
This means from –11 to 0, including 0, that there are 12 integers.

The remaining 28 marks from 1 to 28 on the number line.

The largest integer is 28.

17. (C) $80 + 40 + 86 + 105 + 55 = 366 \approx 400$ Cal.

18. (D)



19. (B) May – June $\rightarrow$ $3 \times 10 = 30$

20. (D) The difference between the numbers is 1 but the sum is not 59.

21. (C) Perimeter of the given triangle

$$= 10 + 25 + 29$$

$$= 44 \text{ cm}$$

So, the length of the wire is 44 cm

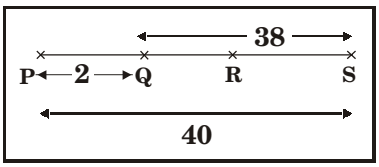
perimeter of the shape (C)

$$11 + 11 + 11 + 11 = 44 \text{ cm}$$

So, the same piece of wire can be used to construct shape (C)

22. (A)

23. (C)



$$\frac{PR}{RS} = \frac{PS - RS}{RS}$$

$$\frac{7}{3} + 1 = \frac{PS}{RS}$$

$$\frac{1}{3} = \frac{4}{RS}$$

$QR = 38 - 12 = 26$

24. (C) $\left[\frac{p}{3} \times q^2\right] \div 3$

$$\frac{pq^2}{3 \times 3} = \frac{pq^2}{9}$$

25. (C)  base is a four sided figure and a pyramid

$\therefore$ four triangular faces.

Physics

26. (B) In the given circuit, bulb glows only when switch is in 'ON' position with bulb connected to a cell.

27. (C) R is the correct position without any parallax error.

28. (B) Rahul can observe the candle as the holes in the pieces of cardboard are in straight line and light always travels in straight line.

29. (A) When an iron bar is stroked with a bar magnet the end A from where the process starts develop the same polarity as the pole of the magnet stroking and the other end develops opposite polarity. Therefore, A – N pole, B – S pole.

30. (C) The spinning of a top moves about a fixed axis without changing its position with respect to time.

31. (A) Shadows only gives some information about the shape of the object as sometimes they can mislead us about the shape of the object with an animal or certain figure.

32. (D) Wires are insulated to prevent shock and short circuit.

33. (C) A thermometer does not need magnet to work with.

34. (A) On incident of light onto an iron ball (an opaque object), light gets blocked. This light passes through clear plastic sheet which is transparent and falls on the wall which acts as a screen. Hence, shadow formed is shown in option (A).

35. (D) Artificial magnets can be prepared in different shapes. This is observed in the above figure.

36. (A) A hair strand is very thin in the order of one-tenth of a mm, which cannot be measured using a tape.

Length of a curved line, playgrounds can be measured using a measuring tape.

37. (A) When sufficient current flows through the filament of a bulb, the bulb lights up.

38. (A) An metal plate is an opaque object and does not allow any light to pass through it. Hence, forms dark shadow of object 'X'.

39. (B) The symbol is an electric switch. An electric switch is used to make or break a circuit.

40. (D) An odometer measures the speed of the vehicle but not the time.

41. (C) On coating a magnet with a layer of oil, the magnet does not lose its magnetism.

42. (B) A non-luminous object can reflect light into our eye and causes sensation of vision. Hence, non-luminous object is visible to us.

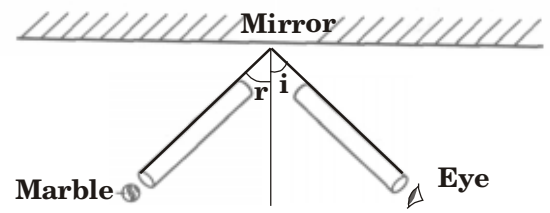
43. (A) The stick undergoes rotatory motion.

44. (D) Electrical wires are insulated with insulators of electricity.

45. (D) $1\,\text{cm} = \frac{1}{100}\,\text{m}$

= hundredth of a metre.

46. (C) A plane mirror works on the principle of reflection of light. According to the diagram, the position of marble and position of eye at tube R can make Anu see the marble.



47. (D) In a circuit diagram, symbols are used to represent components in an electric circuit.

48. (B) Hand span – width of fingers.

Cubit – length from the elbow to the finger tips.

Yard – distance between the end of the outstretched arms and their chin.

49. (A) Glow worm, star are luminous sources of light while metal spoon is not a source of light. Glow worm gives light by using the phenomenon of chemiluminenscence.

50. (C) Distilled water is a bad conductor of electricity. Acid, copperwire and human body can conduct electricity.

Chemistry

51. (D) Materials bottle cap, disposable fork and PVC table can be made out of plastic. Hence Group X is plastic materials. Mirror, wine glass and light bulb are made of glass. Hence, Group Y is glass.

52. (C) By threshing (i.e. beating the stalks on a slab) grain seeds are separated from stalks.

53. (B) The hammock must be strong enough to withstand weight and also flexible so that on putting a weight it expands.

54. (B) Occurrence of earthquakes causes damage to plant and animal life. Hence, is an undesirable change.

55. (D) If the rod is flexible it can be bent easily.

56. (A) Sieving is used to separate a mixture in which components of the mixture are of different sizes.

57. (B) A needle (for sewing) and a knife (for cutting) are hard and magnetic. Hence, they both belong to the same group.

58. (C) When the flask is horizontal. The water level in the flask when tilted is as in flask given in option (C).

59. (C) Separation of glass pieces from sugar by handpicking is the easiest way as compared to other methods.

To separate the mixture by dissolving in water process of evaporation is needed (external heat supply).

60. (D) On making gold it is only change in shape of gold i.e. a physical change. But the ring can be again made to form a pure gold.

61. (C) Material Z absorbs the oil the least and hence allows greater amount of oil (unabsorbed) into the bowl.

62. (A) As the size of the droplet increases, the droplet becomes heavier and the raindrop falls as rainfall.

63. (A) Mixture of water and sulphur is solid-liquid heterogeneous mixture. Hence, it can be separated by using the method of filtration.

64. (A) Heating of sugar is a chemical change as it gets charred to form carbon.

65. (C) Winnowing is a method of air blowing used by farmers to separate grains like wheat and rice from husk. Air blows away the husk which is lighter than grains.

66. (D) A homogeneous mixture is that in which constituents of the mixtures cannot be distinguished.

67. (B) Coagulation is responsible for curdling of milk by the addition of lemon juice.

68. (A) As cotton can absorb water more easily cotton is of first preference.

69. (C) Water coagulates the dust particles and on sweeping them, the dust particles separate out from the floor of the room easily and maximum extent. Else, the dust particles fly away in the air on sweeping and again

settles on the floor after some time.

70. (D) Air pollution is due to increase in level of harmful gases in atmosphere. These are increased by the combustion of fuels in the vehicles. Therefore, on reducing them on the roads, air pollution can be prevented.

Biology

71. (C) Meat is a rich source of animal protein. Proteins are needed for the growth and repair of body. Food containing proteins are called 'body building foods'. Foods containing butter are called energy giving foods. Whole grains are the main source of roughage. Dietary fibres are also known as roughage.

72. (B) A camel has one or two humps on its back. This hump stores fats as reserve food. When food is available it eats plenty at the hump grows. The food from the hump is used by the camel when it goes without food for many days. The hump then gets reduced.

73. (C) Moist and soft skin helps frog in taking in oxygen from the water around and lungs to breathe when they are on land.

74. (A) Option 'A' consists of a herbivore (Giraffe), carnivore (houselizard) and an omnivore (rat).

75. (A) Arrangement of veins is called venation. In a reticulate venation, a mid vein is seen running along the centre of the leaf blade and a network of veins along the blade. Reticulate venation is the characteristic feature of dicot plants.

76. (A) Nylon is a man made material.

77. (B) Dilute iodine solution is used to test for starch.

78. (D) The above classification is grouped on the basis of their sources. Cotton, jute and flax are obtained from plant sources and fur, leather and silk are obtained from animal sources.

79. (C) The needle like leaves of cactus are speical leaves which contain no chlorophyll. Their function is to protect the water storing stem. These leaves discourage animals from eating the cactus.

80. (D) During photosynthesis carbon dioxide is taken in and oxygen is given out whereas in respiration oxygen is taken in and carbon dioxide is given out. Hence arrows labelling Q and R are wrong.

81. (C) Style, anther and ovary together called gynoecium. Gynoecium is the female reproductive part of a flower.

82. (B) Joints at elbow and knee are called hinge joints and shoulder and hip are called ball and socket joint.

83. (C) Amla is a good source of vitamin C. Chemically it is ascorbic acid. It saves from bleeding gums (scurvy).

84. (A) Paper is made of wood pulp from trees. It is biodegradable, useful and can be recycled into paper once again. Hence, paper has all the qualities given for P.

85. (D) Living things take birth, grow old and die. Before death they reproduce to give birth to youngones. This is true for all the organisms. This cycle of life goes on and on. This called life cycle.

86. (B) Ginger and potato are thick and fleshy food storing stems. These stems grow towards soil and remain underground. They look like roots but are stems since they bear nodes, scale leaves and buds upon them.

87. (A) Plants exhibits phototropism.

88. (A) Compressing of raw cottons is called baling.

89. (B) Hip and shoulder joints are called ball and socket joint.

90. (B) Mangroove grow in marshy areas. Marshy soil lacks air space.