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NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION - 2013

SOLUTIONS FOR CLASS : 6

1. (D) $y = 3\,0\,0\,7\,0\,0\,0$
$x = 3\,0\,0\,6\,9\,6\,0$
$6\,0\,1\,3\,9\,6\,0$

2. (C) $1\frac{2}{5} = \frac{7}{5}$

$1\frac{2}{5}+1\frac{2}{5}+1\frac{2}{5}+1\frac{2}{5} = \boxed{3}\times\frac{7}{5}+1\frac{2}{5}$

3. (B) Monday $\rightarrow$ 300
thrice of Monday i.e., $3\times 300 = 900$
i.e., Saturday

4. (B) The smallest 6-digit odd number = 100001
The largest 4-digit even number = 9998
90003

5. (A) 0.108×15
1.620 i.e., 1.62

6. (C) $2 \times m + 6 = 2m + 6$

7. (D) $120 - 60 \div 60 + 4 - 2$
$= 120 - 1 + 4 - 2$
$= 124 - 3$
$= 121$

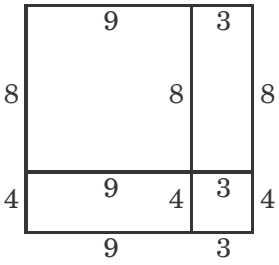
8. (C) Perimeter of the given figure = a + a + b + b
$= 2a + 2b$
$= 2(a + b)$

9. (B) $2x - x = 2x + x - 108$
$2x = 108$
$x = 54$

10. (A) Difference let the numbers
$= 108 - 54 = 54$

A $\rightarrow 36 \rightarrow 9 \times 4$
12×3
6×6

B $\rightarrow 24 \rightarrow 6 \times 4$
8×3
12×2



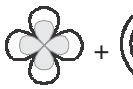
$8 + 4 = 9 + 3 = 12$
$\therefore$ Area of square $= 12^2 = 144$ sq. units.

11. (D) Kavya's age in 7 years' time = K + 7
Father's age in 7 years' time = 2(K + 7)

12. (A) X = First odd number = 3
Y = Only even prime number = 2
$\therefore$ Their L.C.M. $= 2\times 3 = 6$

13. (D) $1-\left(\frac{1}{8}+\frac{3}{8}+\frac{1}{3}\right)=1-\frac{5}{6}=\frac{1}{6}$

14. (D)  = 98

 = 72

$\therefore$  = 98 – 72 = 26

So, 

 =

$[72 \times 2] + [26 \times 3]$
$= 144 + 78$
$= 222$

15. (B) The number 37 in the pattern is multiplied by multiples of 3 and since the digits in the result are same and also in sequence, Z = 3 × 8 = 24.

16. (A) Mass of 8 bags of flour = 4.92 × 8
= 39.36 kg

Mass of the sack of rice = (51.4 – 39.36)kg
=12.04 kg

17. (A) The calculation becomes,
$12 \div 3 - 4 \div 2 = 4 - 2 = 2$

18. (C) $\frac{2013 \times 2.013}{201.3 \times 20.13} \times \frac{10}{10} = \frac{2013 \times 20.13}{2013 \times 20.13} = 1$

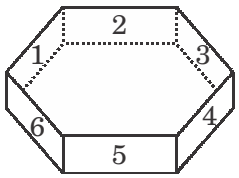
19. (D) To be divisible by 5, the last digit must be 0 or 5. To be divisible by 4, the last two digits must be a multiple of 4. There are no multiples of 4 with a units digit of 5 and hence y = 0. So the five digit number is 24 *x* 80. To be divisible by 9, the sum of the digits must be a multiple of 9. The sum of the digits is 14 + *x*. The smallest *x* can be 0 and the largest can be 9. Therefore the sum of the digits is between 14 and 23. The only multiple of 9 in this range is 18 and therefore *x* = 4 and sum i.e., *x* + y = 4.

20. (C) Rounding off to nearest tens, we get
5660×2230

21. (A) a + b + c + d = 2012, 2b + 2d = 4026
a + b + c + d – 2b – 2d = a – b + c – d
= 2012 – 4026
= – 2014

22. (D) C = πd $\Rightarrow$ The circumference of a circle is π times its diameter.

23. (C) 6 sides, 1 top and 1 bottom.



24. (C) $(12 \times 7) - \left[2\left(\frac{1}{2} \times 6 \times 7\right)\right]$
= 84 – 42 = 42 cm^2

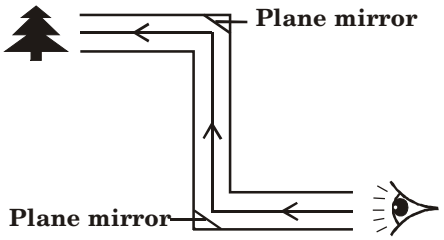
25. (C) 30 – (14 – 2 × 3) = 30 – (14 – 6)

Physics

26. (C) Nickel and Chromium as (Nichrome) is a combination of two metals used to produce heat in an electric heater.

27. (A) As 1 cm = 10 mm, each part is equal to one millimetre.

28. (B) The given information is about a periscope which is 'Z' shaped. Two plane mirrors are arranged at corners making an angle of 45° as shown below:



Reflection on the two mirrors helps us to see objects around the corners.

29. (B) Circuit 'B' with two cells and one bulb glows more brightly than the other bulbs because the chemical energy produced by the two cells is more than the consumption of light energy by one bulb.

30. (C) The correct length of pencil is 4.5 –1
= 3.5 cm.

31. (D) Copper, gold and silver are non-magnetic substances or metals. Iron nail, being a magnetic substance can be attracted by a magnet.

32. (B) Plastic, rubber and ebonite can be used as insulators because electricity cannot pass through them.

33. (A) Periodic motion is observed in a moving pendulum because it repeats at regular intervals of time.

34. (D) When an opaque object comes in the path of light rays, a shadow is formed.

35. (A) When electricity passes through different appliances, heat, light, magnetic, sound and chemical effects are produced. In option (A), a microwave oven which produces heating effect is correctly matched.

36. (C) A measuring tape can be used to measure the heights of pupils, length of a bag and to take body measurements. It cannot measure the thickness of a glass piece.

37. (B) A natural magnet is known as magnetite because it was found first at Magnesia in Greece. Hence, the name magnet has been derived from magnetite.

38. (D) A switch in an electrical circuit is used to complete the circuit.

39. (B) The distance between Alok's school and his house is 245 m.

To and fro distance = 245 × 2 = 490 m.

40. (A) Silver, being a metal can be used as a conductor of heat and electricity.

41. (D) The smallest and standard unit of length is millimetre.

42. (D) The given circuit diagram has a battery, and the switch is closed due to which the bulb glows.

43. (A) We can measure the given length of a curved line by using some thread, an ink pen and a scale.

44. (C) Glass being a transparent material is used to make the outer casing of an electric bulb. When the filament glows, bright light is emitted through the glass clearly. Also, glass is a bad conductor of heat and electricity. Hence, it is ideal for use.

45. (D) 6.8 cm is the correct reading to be taken for measuring the length.

46. (D) The smallest unit of time is second in all the three systems of units as below:

F. P. S. – Foot, pound, second.

C.G.S. – Centimetre, gram, second.

M.K.S. – Metre, kilogram, second. or S.I

47. (C) A transparent glass can be converted into a reflecting mirror by coating it with red coloured paint on one of its sides.

48. (D) Honey bees collect nectar from flowers of plants located at different places. Their motion does not follow a specific direction. Hence, random motion is observed by honey bees.

49. (D) The metal disc shown with an arrow acts as a negative terminal in an electric cell.

50. (C) In the working of a pinhole camera, 'X' is a convergent beam of light rays coming from the object (an apple) kept in front of a pinhole camera which meet at a point i.e., at the pin hole. At the pin hole, 'Y' rays intersect and again form a divergent beam of light rays 'Z' which spread inside the dark box to form an inverted image of the object.

Chemistry

51. (A) When we burn paper, it changes to ash and smoke. It is an irreversible change because we cannot get back the original paper from the ash and smoke.

52. (D) In the process of obtaining a clean product before cooking, it is necessary to remove impurities, separate useful components and to remove harmful substances.

53. (C) Cotton fibres are made from the fruits of a cotton plant. The fruits of the cotton plant are called cotton bolls which burst open after they mature.

54. (D) Different wastes generated from the kitchen of every house is dumped into huge and covered pits. This wastes undergo respiration in the absence of air and produce biogas which can be used for cooking, produce traffic signals etc.

55. (B) In threshing the stalks containing grains are beaten on the stone to make the grains free from stalks.

56. (D) Fruits of cotton plant called cotton bolls are combed to separate seeds and fibres. This process is called ginning. After ginning cotton fibres are arranged vertically and horizontally on spindles to weave it into a cotton cloth or fabric.

57. (A) Iron filings can be separated from sand and salt by using a magnet. Sand and salt are added to water, salt dissolves leaving behind sand. Salt solution is filtered and evaporated to obtain crystals of salt.

58. (D) From the given description, it is clear that the food item (puri) which is fried in the oil has undergone an irreversible change. It is because, we cannot get back the small dough of wheat flour intact again in the same state, once it is fried.

59. (D) Coconut oil becomes semi-liquid or semi-solid during the winter and rainy seasons due to low temperature whereas it remains in the liquid state in summer due to high temperature.

60. (B) Salt meadows filled with sea water are evaporated naturally by sunlight. Wind also helps in its evaporation to some extent. Impure and concentrated salt solution is obtained which is further processed to get pure salt crystals.

61. (B) When wet clothes are dried under the hot sun during the daytime, small droplets of water from wet clothes evaporate into the atmosphere as water vapour. This process is invisible and continues till the clothes are dried. It cannot be seen with our naked eyes.

62. (B) Book - opaque, Metal wire - ductile, Liquid-miscible, Sheets - malleable

i - r, ii - p, iii - s, iv - q

63. (B) Ground glass is translucent in nature because it allows light to pass through it partially.

64. (A) Sieving is a process by which wheat flour and bran are separated by using a siever.

65. (D) Aluminium being a metal is a good conductor of heat and electricity. It is used for making pressure cookers. As pressure cooker has a high temperature while cooking, it cannot be handled. The handle of a pressure cooker is made up of an insulator, mostly ebonite, which is a bad conductor of heat and so it can be handled easily.

66. (D) A pit lined internally with bricks and cement will store rain water for future use. Sand cannot hold water, so it seeps into the ground. Clay and mud pits absorb water and if it is in excess, it seeps into the ground. Hence, the purpose cannot be served.

67. (B) The plant which is harvested in the flowering stage is jute.

68. (D) When pressure is applied on the upper and lower sides of a balloon filled with air after loosening the thread tied to the mouth of the balloon, we observe that the air inside

the balloon undergoes compression. The compressed air moves out slowly till the balloon is emptied and regains its normal size.

69. (B) Object 'X' is a cork which floats on the surface of water in the beaker. Object 'Y' is a coin which is heavy, so it sinks in the water in the beaker.

70. (B) By stretching the rubber band, it increases in its length due to the elastic nature of rubber. Once the stretching is stopped, it regains its original length. Hence, it can be termed as a reversible change.

Biology

71. (A) Leaves lose water in the form of water vapour from their surface. This loss of water in plant is called transpiration.

72. (C) The given characteristics belong to frog. Frog is an amphibian. It is an insectivorous animal. It lays its eggs in water and has a soft and moist skin.

73. (B) The skull is a bony box. It is also called cranium or the brain case. It protects the brain from injury.

74. (D) Bear is an Omnivore. Omnivores eat both plants and animals. Giraffe is a herbivore. Herbivores are plant eating animals, lizard is a carnivore. Carnivores are flesh eating animals.

i-r, ii-p, iii-q

75. (C) Snakes move by contracting and expanding its body parts, during this it drags along the ground. This kind of movement by sliding or gliding is called slithering.

76. (A) Vitamin A is found abundantly in green yellow fruits and vegetables like carrot and papaya. Vitamin A is essential for healthy skin and bright eyes. Its deficiency may lead to night blindness and dryness of eyes.

77. (B) The given figure represents a ball and socket joint. Ball and socket joints are found at hip and shoulder.

78. (A) Deficiency of protein and calories leads to protein calorie malnutrition. Which causes marasmus disease.

79. (C) The sequence that follows the increasing order of complexity in a multicellular organism is cell $\rightarrow$ tissue $\rightarrow$ organ $\rightarrow$ system. Cells are the building blocks of life.

80. (A) The arrows in the given figure transports water and mineral salts.

81. (A) Fish is rich in proteins. Proteins help in growth and repair of the damaged cells in our body.

82. (A) Cockroach has three pairs of jointed legs and two pairs of wings attached to its breast. They may walk, climb on a wall or fly in air for a short distance.

83. (C) Plants and animals depend upon each other for their needs. Plants provide fresh air, food and shelter to animals and in return animals help plants with pollinating their flowers, dispersing their seeds and fruits.

84. (C) Roots of plants such as carrot, radish, turnip and beetroot are eaten as food stored in them.

85. (B) Mangrove plants grow in muddy soil full of salt water and devoid of air (oxygen).

They bear special breathing roots that come out into the air. These roots bear pores called lenticels, that absorb air.

86. (D) In the given figure arrow P $\rightarrow$ Water

Q $\rightarrow$ Sugar, R $\rightarrow$ Carbon dioxide, S $\rightarrow$ Oxygen.

87. (D) Arboreal orchids are also called epiphytes. (Epi means upon, phyte means plant).

Epiphyte plants have special roots called Valei man roots. These roots cling the supporting branch and rest hang in air to absorb moisture.

88. (B) Plants such as cuscuta are non-green and without normal roots. They live as parasites on other green host plants. They bear specialised roots that penetrate into the stem of the host and suck nutrients and water.

89. (A) Banana is a herbaceous plant. It is a biennial plant.

90. (D) The change to which an organism responds is called stimulus.

Mimosa plant is called touch-me-not plant. It is sensitive to touch. When we touch the leaves of this plant, they immediately fold up and droop down.