1. If $2^x = 4^y = 8^z$ and $\left(\frac{1}{2x} + \frac{1}{4y} + \frac{1}{6z}\right) = \frac{24}{7}$ then the value of z is

   a) $7/16$
   b) $7/32$
   c) $7/48$
   d) $7/64$

2. If $\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}} = \frac{a+b\sqrt{6}}{15}$ and $\left(\frac{a}{b}\right)^x \left(\frac{b}{a}\right)^{2x} = \frac{64}{729}$ then find x.

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

3. If $x = \frac{(\sqrt{3}+1)}{2}$, then the value of $4x^3 + 2x^2 - 8x + 7$ is

a) 8

b) 10

c) 15

d) 14

4. The factors of $\left[\dfrac{2}{x^4} - \dfrac{1}{x^2}\right]$ will be

a) $\left(\dfrac{\sqrt{2}}{x^4} + \dfrac{1}{x}\right)\left(\dfrac{\sqrt{2}}{x^4} - \dfrac{1}{x}\right)$

b) $\left(\dfrac{\sqrt{2}}{x^2} + \dfrac{1}{x}\right)\left(\dfrac{\sqrt{2}}{x^2} - \dfrac{1}{x}\right)$

c) $\left(\dfrac{\sqrt{2}}{x} + \dfrac{1}{x}\right)\left(\dfrac{\sqrt{2}}{x} - \dfrac{1}{x}\right)$

d) None of these.

5. The area of the triangle formed by the points A(2,0), B (6,0) and C(4,6) is
   a) 24 sq. units
   b) 12 sq. units
   c) 10 sq. units
   d) None of these

6. Find the point of intersection of the straight lines
$x + y - 7$ and $4x + 5y - 30 = 0$
   a) (2,5)
   b) (1,6)
   c) (5,2)
   d) None of these

7. In a triangle , if $\angle A = 2\angle B = 6\angle C,$ then find the value of $\dfrac{\angle A + 2\angle B}{3\angle C}.$

   a) 4^0

   b) 3^0

   c) 6^0

   d) 8^0

8. If D is the mid point of the hypotenuse AC of a right angles triangle ABC, then BD=

a) $\frac{1}{2}AB$

b) $\frac{1}{2}AD$

c) $\frac{1}{2}AC$

d) None of these

9. If AP and BP are the bisectors of the angle A and angle B of a parallelogram ABCD, then value of the angle APB is

a) 30^0

b) 45^0

c) 60^0

d) 90^0

10. A person walks diagonally across a square plot. Approximately, what was the percentage saved by not walking along the edges?

a) 35%

b) 30%

c) 20%

d) 25%

11. A circle passes through the vertices of the equilateral $\triangle$ABC . The measure of an angle subtended by the side AB at the center of the circle is

a) 30^0

b) 60^0

c) 90^0

d) 120^0

12. If the height of the right circular cylinder is increased by 10% while radius of base is decreased by 10%, then the curved surface area of the cylinder will_

a) Remains same

b) Decreases by 1%

c) Increases by 1%

d) Increases by 0.1%

13. A copper wire 3mm in diameter is rounded about a cylinder whose length is 1.2m and diameter is 10 cm, so as to cover the curved surface of the cylinder. The length of the wire is
   a) 125.6 m
   b) 1256 m
   c) 12.56 m
   d) 1.256 m

14. The average of 9 numbers is 18. If the average of first five numbers is 19 and the average of last 5 numbers is 17, find the 5th number.
   a) 16
   b) 20
   c) 18
   d) 22

15. A bag contains five red balls and some blue balls. If the probability of drawing a blue ball is double that of red ball, then the number of blue ball in the bag is
   a) 19
   b) 20
   c) 15
   d) 10

16. Amar has some notes of rupees 10 and 20 rupees the total number of notes are 70 and the total amount of money with him is 1050 rupees find the number of notes of 10 rupees and 20 rupees with him.
   a) 30 & 40
   b) 35 & 35
   c) 40 & 30
   d) 45 & 25

17. The graph of $y = x^3 - 4x$ cuts x- axis at (-2, 0), (0,0) & (2,0). The zeroes of $x^3 - 4x$ are
   a) 0,0,0
   b) -2,2,2
   c) -2,0,2
   d) -2,-2,2

18. The graph of the polynomial p(x) cuts the x-axis at 2 places and touches it at 4 places. The number of zeroes of p(x) is
   a) 2
   b) 6
   c) 4
   d) 8

19. If the diameter of a sphere is decreased by 25%, then by what percent the curved surface area will be decreased?
   a) $33\frac{3}{4}\%$
   b) 75%
   c) 25%
   d) $43\frac{3}{4}\%$

20. From a pack of 52 cards, a card is chosen at random. Find the probability that the chosen card is:
        (i) A black king
        (ii) Neither a heart nor a king

	(i)	(ii)
a)	1/26	7/13
b)	1/13	9/13
c)	1/13	7/13
d)	1/26	9/13

21. A small ball is dropped from a balloon moving vertically up at a speed 10 m/s when the balloon is at a height 15 m from the ground. Neglect air friction and take $g = 10m/s^2$. Which of the following is not suitable to the present situation?
   a) The ball reaches the ground
   b) The ball covers a distance of 25 m.
   c) The magnitude of average velocity of the ball is 8.33 m/s.
   d) The ball moves up at a speed 10 m/s at an instant when it is dropped from the balloon.

22. Pick the fundamental law of motion.
   a) Newton's first law of motion.
   b) Newton's second law of motion.
   c) Newton's third law of motion.
   d) All laws of motion.

23. The Unit of $\frac{G}{g}$ is
   a) $kg\, m^{-1}$
   b) $kg\, m^{-2}$
   c) $m^2 kg^{-1}$
   d) $m\, kg^{-1}$

24. A planet of volume V and mass m has gravitational acceleration g on its surface. If it expands to 8 times its original volume, what will be the acceleration due to gravity?
   a) 4 g
   b) 2 g
   c) g/4
   d) g/8

25. A body weighs x g in air, y g in liquid and z g in water. The ratio of relative density of liquid and the body is

   a) x - y : x
   b) x - y : z
   c) y - z : x
   d) z - y : y

26. A ball is projected vertically upwards with an initial velocity. Which of the following graphs best represents the K.E. of the ball as a function of time from the instant of projection till it reaches the point of projection?

a)

b)

c)

d)
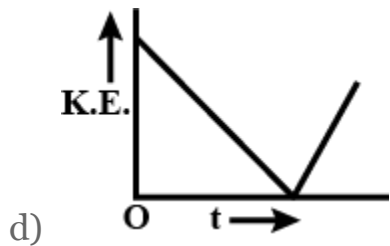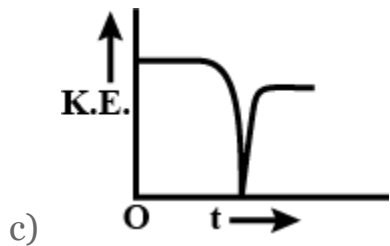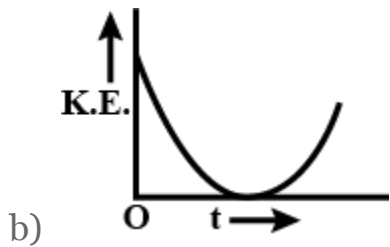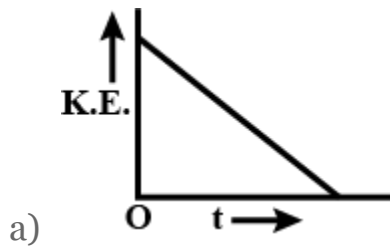
27. Which of the following is carried by waves from one place to another?
   a) Mass
   b) Velocity
   c) Wavelength
   d) Energy

28. A metal M has its Chloride formula MCl3 and the equivalent weight of metal is 9. Atomic weight of element is
(a) 9
(b) 18
(c) 27
(d) 3

29. The atomic number of an element X is 12. What is the formula of its azide?
(a) X_2N_3
(b) $X(N_3)_2$
(c) X_3N_2
(d) XN_3

30. When the same amount of zinc is treated separately with excess of dil. H2 SO4 and excess of NaOH, what is the ratio of volumes of H2 evolved?
(a) 1: 1
(b) 1: 2
(c) 2: 1
(d) 9: 4

31. Which of the following statements about isotopes of an element is not correct?
(a) Isotopes have the same proton number.
(b) Isotopes have the same chemical properties.
(c) Isotopes have the same nucleon number.
(d) Atoms of the isotopes of the element have the same number of electrons.

32. What is the ratio of the number of neutrons present in potassium atoms and magnesium atoms with mass numbers 39 and 24?
(a) 19: 12
(b) 5: 3
(c) 5: 6
(d) 4: 3

33. Consider the following statements:
A. Atoms of an element may have more or less neutrons or electrons than other atoms of the same element.
B. β-Particles are fast moving electrons carrying negative charge.
Which of these statement(s) is/are correct?
(a) A only
(b) B only
(c) Both A and B
(d) Neither A nor B

34. Which of the following is not a function of the vacuole in plants?
a) They store toxic metabolic wastes.
b) They help with the process of cell division.
c) They help to maintain turgidity.
d) They provide structural support.

35. Cell wall of which one of these is not made up of cellulose?
a) Bacteria
b) Hydrilla
c) Mango tree
d) Cactus

36. Which cell does not have a perforated cell wall?
a) Tracheids
b) Companion cells
c) Sieve tubes
d) Vessels

37. Choose the wrong statement:
a) The nature of the matrix differs according to the function of the tissues.
b) Fats are stored below the skin and in between the internal organs.
c) Epithelial tissue has intercellular spaces between them
d) Cells of striated muscles are multinucleated and unbranched

38. Which one of the following disease is caused by protozoans?
a) Malaria
b) Influenza
c) AIDS
d) Cholera

39. What would happen, if all the oxygen present in the environment is converted to ozone?
a) We will be protected more
b) It will become poisonous and kill living forms
c) Ozone is not stable, hence it will be toxic
d) It will help harmful Sun radiations to reach Earth and damage many life forms.

 40. Vitamins that are included in the poultry feed are:
a) Vitamin A and B
b) Vitamin B and C
c) Vitamin A and C
d) Vitamin A and K