ALVA'S SCHOLARSHIP EXAMINATION SAMPLE PAPER

SECTION – 1 : MATHEMATICS

1. If $a = 2^2 \times 3^x$, $b = 2^2 \times 3 \times 5$, $c = 2^2 \times 3 \times 7$ and LCM (a, b, c) = 3780, then x is .....
1) 1 2) 2 3) 3 4) 0

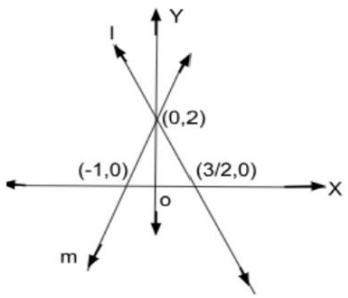
2. The shortest distance (in units) of the point (2, 3) from y-axis is .....
1) 2 2) 3 3) 5 4) 1

3. If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are not parallel, then k has to be .....
1) $\frac{15}{4}$
2) $\neq \frac{15}{4}$
3) any rational number
4) any rational number having 4 as denominator

4. If the area of the base of a right circular cone is 51cm^2 and its volume is 85cm^3, then the height of the cone is given as .....
1) $\frac{5}{6}$cm 2) $\frac{5}{3}$cm 3) $\frac{5}{2}$cm 4) 5cm

5. If $\sec\theta + \tan\theta = x$, then $\sec\theta - \tan\theta$ will be .....
1) x 2) x^2 3) $\frac{2}{x}$ 4) $\frac{1}{x}$

6. The system of linear equations represented by the lines l and m is .....
1) Consistent with unique solution
2) Inconsistent



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3) Consistent with three solutions
4) Consistent with many solutions

7. If $\Delta ABC \sim \Delta PQR$ such that 3AB = 2PQ and BC = 10 cm, then length QR is equal to .....

1) 10 cm 2) 15 cm 3) $\frac{20}{3}$cm 4) 30 cm

8. The 4th term from the end of the A.P –8, –5, –2,....., 49 is _____

1) 37 2) 40 3) 1 4) 43

9. The roots of quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ are .....

1) Not real
2) Real and equal
3) Rational and distinct
4) Irrational and distinct

10. $\frac{1-\tan^2 30^\circ}{1+\tan^2 30^\circ}$ is equal to .....

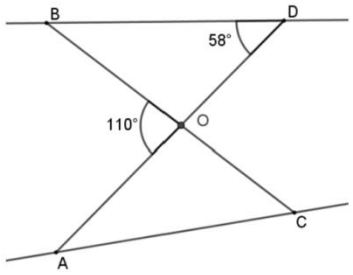
1) $\cos 60^\circ$ 2) $\sin 60^\circ$ 3) 1 4) $\tan^2 60^\circ$

11. A quadratic polynomial whose zeroes are $\frac{2}{5}$ and $\frac{-1}{5}$ is .....

1) $25x^2 + 5x - 2$ 2) $5x^2 - 2x + 1$ 3) $5x^2 + 2x - 1$ 4) $25x^2 - 5x - 2$

12. In the given figure, if $\Delta OCA \sim \Delta OBD$ then $\angle OAC$ is equal to .....

1) 58°
2) 55°
3) 128°
4) 52°



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13. If the circumference of a circle is equal to the perimeter of a square then the ratio of their areas is ……

1) 22:7 2) 14:11 3) 7:22 4) 7:11

14. A pole 6m high casts a shadow $2\sqrt{3}$ m long on the ground, then the sun's elevation is ……

1) 60° 2) 45° 3) 30° 4) 90°

15. If α and β are the zeroes of polynomial $3x^2 + 6x + k$ such that $\alpha + \beta + \alpha\beta = -\frac{2}{3}$, then the value of k is ……

1) –8 2) 8 3) –4 4) 4

16. The decimal expansion of 22/7 is ……

1) Terminating 2) Non-terminating and repeating
3) Non-terminating and Non-repeating 4) None of the above

17. The zeroes of x^2-2x-8 are ……, ……

1) (2,-4) 2) (4,-2) 3) (-2,-2) 4) (-4,-4)

18. The least number that is divisible by all the numbers from 1 to 5 is:

1) 70 2) 60 3) 80 4) 90

19. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

1) 10 2) –10 3) 5 4) –5

20. (Sin 30°+cos 60°)-(sin 60° + cos 30°) is equal to:

1) 0 2) $1+2\sqrt{3}$ 3) $1-\sqrt{3}$ 4) $1+\sqrt{3}$

21. The pairs of equations x+2y-5 = 0 and -4x-8y+20=0 have:

1) Unique solution 2) Exactly two solutions
3) Infinitely many solutions 4) No solution

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22. Equation of $(x+1)^2-x^2=0$ has number of real roots equal to:
1) 1 2) 2 3) 3 4) 4

23. If the lines 3x+2ky – 2 = 0 and 2x+5y+1 = 0 are parallel, then what is the value of k?
1) 4/15 2) 15/4 3) 4/5 4) 5/4

24. The sum of two numbers is 27 and product is 182. The numbers are:
1) 12 and 13 2) 13 and 14 3) 12 and 15 4) 13 and 24

25. A fraction becomes 1/3 when 1 is subtracted from the numerator and it becomes 1/4 when 8 is added to its denominator. The fraction obtained is:
1) 3/12 2) 4/12 3) 5/12 4) 7/12

SECTION – 2 : SCIENCE

1. Which of the following is an example of simple displacement ?
1) The electrolysis of water
2) The burning of methane
3) The reaction of a metal with an acid
4) The reaction of two salt solutions to form a precipitate

2. Electrical resistivity of a given metallic wire depends upon ……
1) Its length 2) Its thickness
3) Its shape 4) Nature of the material

3. A student performs an experiment to form aluminium chloride from aluminium and chlorine. Which of the following option gives the chemical equation of the reaction?
1) $Al + Cl_2 \rightarrow AlCl_2$ 2) $2Al + Cl_2 \rightarrow 2AlCl$
3) $2Al + 3Cl_2 \rightarrow 2AlCl_3$ 4) $3Al + 3Cl_2 \rightarrow 3AlCl_3$

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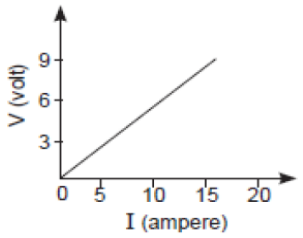
4. The resistance whose $V - I$ graph is given below is .....



1) $5/3\ \Omega$
2) $3/5\ \Omega$
3) $5/2\ \Omega$
4) $2/5\ \Omega$

5. One of the following processes does not involve a chemical reaction, that is .....
1) Melting of candle wax when heated
2) Burning of candle wax when heated
3) Digestion of food in your stomach
4) Ripening of banana

6. A cooler of 1500 W, 200 volts and a fan of 500 W, 200 volts are to be used from a household supply. The rating of the fuse to be used is .....
1) 2.5 A 2) 5.0 A 3) 7.5 A 4) 10 A

7. The contraction and expansion movement of the walls of the food pipe is called .....
1) Translocation 2) Transpiration
3) Peristaltic movement 4) Digestion

8. The chemical formula of magnesium oxide is .....
1) MgO_2 2) Mg_2O 3) MgO 4) $Mg(OH)_2$

9. Work of 14 J is done to move 2C charge between two points on a conducting wire. What is the potential difference between the two points?
1) 28 V 2) 14 V 3) 7 V 4) 3.5 V

10. Which of the equations shows the correct conversion of CO_2 and H_2O into carbohydrates in plants?

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1) $6CO_2 + 6H_2O \xrightarrow[\text{Heat Energy}]{\text{Chlorophyll}} \underset{\text{(Glucose)}}{C_6H_{12}O_6} + 6O_2 + 12H_2O$

2) $6CO_2 + 6H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \underset{\text{(Glucose)}}{C_6H_{12}O_6} + 6O_2 + 12H_2O$

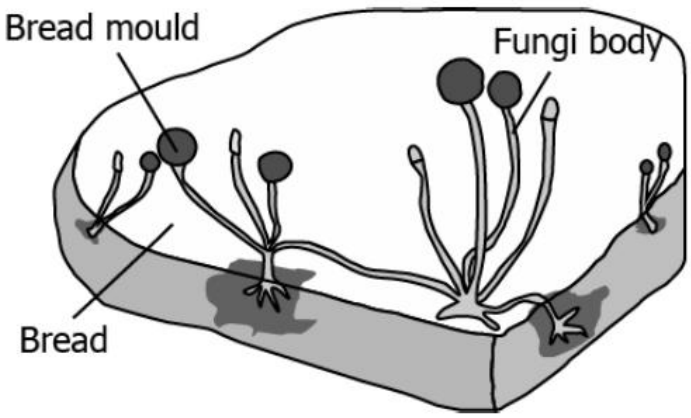
3) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \underset{\text{(Glucose)}}{C_6H_{12}O_6} + 6O_2 + 6H_2O$

4) $6CO_2 + 12H_2O \xrightarrow[\text{Heat Energy}]{\text{Chlorophyll}} \underset{\text{(Glucose)}}{C_6H_{12}} + 6O_2 + 6H_2O$

11. $Na_2CO_3 \cdot 10H_2O$ is known as .....

1) Baking soda
2) Baking powder
3) Washing soda
4) Bleaching powder

12. The following image shows the bread moulds on bread:



How do these fungi obtain nutrition?

1) By eating the bread on which it is growing
2) By using nutrients from the bread to prepare their own food
3) By breaking down the nutrients of bread and then absorbing them
4) By allowing other organisms to grow on the bread and then consuming them

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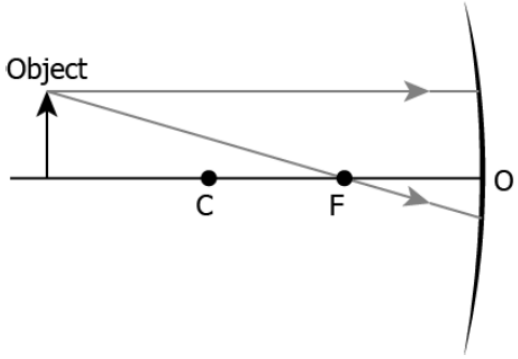
13. An image of an object produced on a screen which is about 36 cm using a convex lens. The image produced is about 3 times the size of the object. What is the size of the object?

1) 12 cm 2) 33 cm 3) 39 cm 4) 108 cm

14. $CuSO_4 . 5H_2O$: In this Compound, the water molecule is called .....

1) Pure water
2) Water of crystallisation
3) Soda water
4) None of these

15. The image shows the path of incident rays to a concave mirror.
Where would the reflected rays meet for the image formation to take place?



1) Behind the mirror 2) Between F and O
3) Between C and F 4) Beyond C

16. A student performs an experiment to form aluminium chloride from aluminium and chlorine. Which of the following option gives the chemical equation of the reaction?

1) $Al + Cl_2 \rightarrow AlCl_2$ 2) $2Al + Cl_2 \rightarrow 2AlCl$
3) $2Al + 3Cl_2 \rightarrow 2AlCl_3$ 4) $3Al + 3Cl_2 \rightarrow 3AlCl_3$

17. The contraction and expansion movement of the walls of the food pipe is called:

1) Translocation 2) Transpiration

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3) Peristaltic movement 4) Digestion

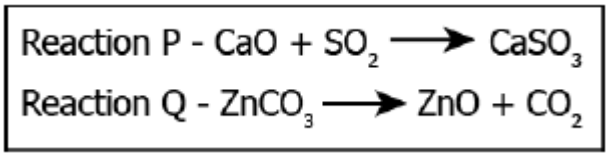
18. The least resistance obtained by using 2 Ω, 4 Ω, 1 Ω and 100 Ω is
1) < 100 Ω 2) < 4 Ω 3) < 1 Ω 4) > 2 Ω

19. One of the following processes does not involve a chemical reaction, that is:
1) Melting of candle wax when heated
2) Burning of candle wax when heated
3) Digestion of food in your stomach
4) Ripening of banana

20. A plant gets rid of excess water through transpiration. What is the method used by plants to get rid of solid waste products?
1) Shortening of stem
2) Dropping down fruits
3) Shedding of yellow leaves
4) Expansion of roots into the soil

21. A fuse wire repeatedly gets burnt when used with a good heater. It is advised to use a fuse wire of
1) More length 2) Less radius 3) Less length 4) More radius

22. A student learns that some products are formed as a result of combining two compounds while some compounds are formed as a result of the dissociation of two compounds. The image shows two reactions.



Which reaction is an example of a combination reaction and a decomposition reaction?
1) Both reactions are examples of combination reaction
2) Both reactions are examples of a decomposition reaction

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3) Reaction P is an example of a combination reaction, while reaction Q is an example of a decomposition reaction
4) Reaction P is an example of a decomposition reaction, while reaction Q is an example of a combination reaction

23. How much more heat is produced if the current is doubled?
1) Twice the original amount
2) Thrice the original amount
3) Four times the original amount
4) Five times the original amount

24. What happens when lead nitrate reacts with potassium iodide?
1) They will not react
2) A large amount of hydrogen will be released
3) Yellow ppt of lead iodide and potassium nitrate will be produced
4) Evolution of gas will occur

25. Two resistors connected in series give an equivalent resistance of 10 Ω. When connected in parallel, give 2.4 Ω. Then the individual resistance is
1) each of 5 Ω 2) 6 Ω and 4 Ω 3) 7 Ω and 4 Ω 4) 8 Ω and 2 Ω

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