

SNGS ACADEMY
SAMPLE PAPER FOR TALENT REWARD TEST
GRADE 10

MATHEMATICS

1. If $x \sin(90^\circ - \theta) \cot(90^\circ - \theta) = \cos(90^\circ - \theta)$, then $x =$
A) 0 B) 1 C) -1 D) 2
2. $\tan 5^\circ \times \tan 30^\circ \times 4 \tan 85^\circ$ is equal to
A) $4/\sqrt{3}$ B) $4\sqrt{3}$ C) 1 D) 4
3. If one zero of the polynomial $f(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other, then k is equal to –
A) 2 B) -2 C) 1 D) -1
4. If the given diagram shows the graph of the polynomial $f(x) = ax^2 + bx + c$, where the parabola opens upward with its vertex $(-b/2a, -D/4a)$ lying in the third quadrant (left of the y-axis and below the x-axis), then:
A) $a > 0, b < 0$ and $c > 0$ B) $a > 0, b > 0$ and $c < 0$
C) $a > 0, b > 0$ and $c > 0$ D) $a < 0, b > 0$ and $c < 0$
5. The value of k for which the system of equations $2x + 3y = 5$ and $4x + ky = 10$ has an infinite number of solutions, is
A) 1 B) 3 C) 6 D) 0
6. The area of the triangle formed by the lines $y = x, x = 6$ and $y = 0$ is
A) 36 sq. units B) 18 sq. units C) 9 sq. units D) 72 sq. units
7. In a $\triangle ABC$, AD is the bisector of $\angle BAC$. If $AB = 6$ cm, $AC = 5$ cm and $BD = 3$ cm, then $DC =$
A) 11.3 cm B) 2.5 cm C) 3.5 cm D) None of these
8. $(-5, -10), (-15, 15), (5, 5)$ are the coordinates of vertices A, B and C respectively of $\triangle ABC$, and P is a point on median AD such that $AP : PD = 2 : 3$. The coordinates of point D is
A) $(5, 10)$ B) $(-5, -10)$ C) $(5, -10)$ D) $(-5, 10)$
9. (Continuing from the above triangle ABC) The coordinates of point P is
A) $(-5, -2)$ B) $(10/3, 5)$ C) $(10/3, 5/3)$ D) None of these
10. The distance between the points $(3, 4)$ and $(7, 1)$ is
A) 5 B) 4 C) 6 D) 7

GENERAL SCIENCE

11. A germinating seed is placed horizontally. The shoot tip bends upward due to negative geotropism. Which statement correctly explains the hormonal basis of this response?

- A) Auxin is evenly distributed, and gravity alone bends the root
- B) Auxin accumulates on the lower side and promotes growth there, bending the tip upward
- C) Auxin accumulates on the lower side and inhibits growth there, so the tip bends downward
- D) Auxin accumulates on the upper side and promotes faster growth there, bending the tip down

12. You accidentally touch a hot object and withdraw your hand before consciously feeling pain. Which pathway correctly describes the sequence of this reflex action, and why is it faster than a voluntary response?

- A) Receptor → sensory neuron → brain → spinal cord → motor neuron → muscle
- B) Receptor → motor neuron directly → muscle, brain uninvolved at any stage
- C) Sensory neuron → spinal cord (relay neuron) → motor neuron → muscle, with signal reaching brain afterward
- D) Sensory neuron → brain → motor neuron → muscle

13. If fertilization does not occur after ovulation in the human female reproductive cycle, the corpus luteum degenerates. What is the direct hormonal consequence of this, and how does it lead to menstruation?

- A) Progesterone falls sharply, causing the uterine lining to break down and shed
- B) The corpus luteum persists and continues secreting progesterone indefinitely
- C) Estrogen levels rise sharply, thickening the lining further
- D) FSH levels drop to zero, directly causing the lining to shed

14. A farmer grows a new mango variety exclusively through grafting (a form of vegetative propagation) rather than by growing it from seeds. Why would offspring from grafting show less genetic variation compared to offspring grown from seeds of the same plant?

- A) Vegetative propagation produces genetically identical clones (mitosis, single parent); sexual reproduction produces variation (meiosis + fusion of two parents' gametes)
- B) Both methods produce equal genetic variation since both involve cell division
- C) Vegetative propagation involves meiosis, producing more variation than sexual reproduction
- D) Sexual reproduction produces clones while vegetative propagation produces variation

15. A plant shoot increases in length primarily due to cell division at its tip. Which tissue is responsible for this, and what structural feature of its cells makes rapid division possible?

- A) Parenchyma, because it is the most abundant tissue in plants
- B) Phloem, because it transports nutrients needed for growth
- C) Sclerenchyma, because its rigid walls support elongation
- D) Meristematic tissue, because its undifferentiated, actively dividing cells at root/shoot tips drive increase in length.

16. A strip of zinc is placed in copper sulphate solution. Which observation is expected?
- A) The solution remains blue and no change occurs
 - B) A reddish-brown deposit forms on zinc and the blue colour gradually fades
 - C) A white precipitate forms and the solution becomes colourless
 - D) Zinc dissolves and the solution becomes dark blue
17. A solution has a pH of 2, while another solution has a pH of 5. Which statement is correct?
- A) The pH 5 solution is more acidic
 - B) Both solutions have the same acidity
 - C) The pH 2 solution has a higher concentration of hydrogen ions
 - D) The pH 5 solution has a higher concentration of hydrogen ions
18. Which of the following reactions demonstrates that aluminium is more reactive than iron?
- A) $\text{Al} + \text{Fe}_2\text{O}_3 \rightarrow \text{Al}_2\text{O}_3 + \text{Fe}$
 - B) $\text{Fe} + \text{Al}_2\text{O}_3 \rightarrow \text{Fe}_2\text{O}_3 + \text{Al}$
 - C) $\text{Al} + \text{CuSO}_4 \rightarrow \text{No reaction}$
 - D) $\text{Fe} + \text{CuSO}_4 \rightarrow \text{No reaction}$
19. Which of the following represents a double displacement reaction accompanied by precipitation?
- A) $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
 - B) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
 - C) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
 - D) $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$
20. A farmer finds that the soil in a field is too acidic. Which substance would be most suitable for treating the soil?
- A) Quicklime (CaO)
 - B) Vinegar
 - C) Sodium chloride (NaCl)
 - D) Carbon dioxide (CO₂)
21. A light ray travels from a rarer medium (like air) into a denser medium (like glass). How does the light ray bend?
- A) It bends away from the normal.
 - B) It bends towards the normal.
 - C) It continues straight without any bending.
 - D) It reflects back into the rarer medium.
22. What is the focal length of a spherical mirror that has a radius of curvature of 20 cm?
- A) 10 cm
 - B) 20 cm
 - C) 40 cm
 - D) 5 cm
23. If the length of a copper wire is doubled while its cross-sectional area remains the same, what will happen to its electrical resistance?
- A) It becomes half of the original resistance.
 - B) It remains exactly the same.
 - C) It doubles.
 - D) It becomes four times the original resistance.

24. Which of the following statements correctly describes the magnetic field inside a long, straight, current-carrying solenoid?

- A) It is zero at all points.
- B) It decreases as we move towards the ends of the solenoid.
- C) It increases as we move towards the ends of the solenoid.
- D) It is uniform (the same) at all points inside.

25. Which rule is used to determine the direction of the magnetic force experienced by a current-carrying straight conductor placed in a magnetic field?

- A) Maxwell's right-hand thumb rule
- B) Fleming's left-hand rule
- C) Fleming's right-hand rule
- D) Right-hand grip rule

ANSWER KEY

Mathematics Answer Key

1. B
2. A
3. A
4. C
5. C
6. B
7. B
8. D
9. A
10. A

General Science Answer Key

11. B
12. C
13. A
14. A
15. D
16. B
17. C
18. A
19. C
20. A
21. B
22. A
23. C
24. D
25. B