

Student's Signature _____



NGSE

CLASS 6

Time :
90 Minutes

**National Genius Search
Examination[®] : Mains**

Student Name

NGSE Roll No

Test Booklet Code:

INSTRUCTIONS TO THE CANDIDATE

- 1. DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO.**
- Fill the information required in the answer sheet. Your test may not be evaluated if the required details are not entered on the answer sheet.
- Do not seek clarification on any item in the test booklet from anyone including the test invigilator or the centre supervisor. Use your best judgment.
- This booklet consists of three sections, as given below :
 - Mathematics – 20 Questions
 - Science – 20 Questions
 - General Knowledge – 5 QuestionsIn case of any problem with your test booklet, inform the invigilator immediately. You will be provided with a replacement.
- Each question carries 2 marks.

Questions from 1 to 45 have one or more options right. **To score full marks for each question, bubbles for all the right answer options should be shaded. Shading one or more wrong bubble/s make the answer wrong. No marks are given for partial answers.**
- Only **BLACK/BLUE BALL POINT PEN** is to be used for marking answers on OMR sheet. Do not use fountain pens/gel based pens or pencils. Remember that you cannot erase and re-shade the bubbles.
- Use the margin in the test booklet for rough work. NO other piece of paper is permitted to be used for rough work.
- NEGATIVE MARKS** are not allotted to any question.
- Failure to follow instructions and examination norms will lead to disqualification.
- Complete the feedback form before you leave the examination hall.

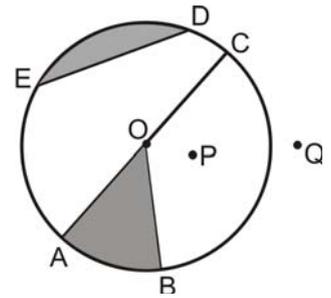
PLEASE WAIT FOR THE SIGNAL TO OPEN THE TEST BOOKLET

Open from this side \longrightarrow

Important Note: Questions from 1 to 45 have one or more options right. To score full marks for each question, bubbles for all the right answer options should be shaded. Shading one or more wrong bubble/s make the answer wrong. No marks are given for partial answers.

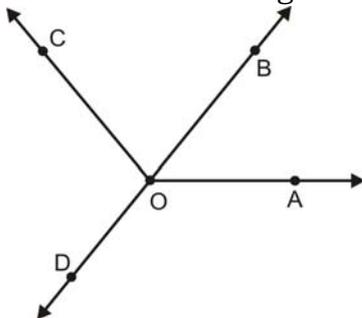
01. The following is the structure of a village well shared by Vidya with 3 of her neighbours - Quana, Richa and Sachin. Sachin's land covering the well is shaded under ED, the area covered under ACDE is owned by Vidya and the area under AOB is owned by Quana. The rest of the well is owned by Richa. Tell us the name/s of the friend/s who share

- (a) the center of the well
 (b) the diameter of the well
 (c) the two interior points marked
 (d) a sector of the well
 (e) two radii
 (f) any chord of the well
 (g) the circumference of the well



Shade 'P' for Vidya, 'Q' for Quana 'R' for Richa and 'S' for Sachin.

02. Where will the hour hand of a clock stop if it starts from 8 and turns through 2 right angles?
 (a) 11 (b) 12 (c) 1 (d) 2
03. The pages on both sides of a fully opened book makes an angle of 180 degrees. What is the measure of the angle it make when the book is kept closed?
 (a) 360 degrees (b) 180 degrees (c) 90 degrees (d) 0 degrees
04. Wisden started watching the James Bond film *Sky Fall* around noon when the angle between the hour and minute hand of the clock was at 30 degrees. He finished watching the film when the minute and hour hand was at 30 degrees. Tell us when did he finish watching the film?
 (a) 1.00 p.m. (b) 1.30 p.m. (c) 2 .00 p.m. (d) 2.30 p.m.
05. The following are the directions where Beckham hit football during a training session. Measuring clockwise, identify the type of angles formed after the hit.



- (a) $\angle COA$ (b) $\angle DOA$ (c) $\angle BOD$ (d) $\angle COB$

Shade bubble 1 for right angle, 2 for straight angle, 3 for obtuse angle, 4 for acute angle, 5 for reflex angle and 6 if no option is correct.

06. Vidya gave four unequal sticks to Wisden and asked him if he can form a quadrilateral such that
- All the four angles are acute
 - One of the angles is obtuse.
 - One of the angles is right angled.
 - Two of the angles are obtuse.
 - Two of the angles are right angled.
 - The diagonals are perpendicular to one another.

Can he form a quadrilateral in each case? What is that quadrilateral called?

The above question has two subsets of answers and both are to be answered / shaded. In the first subset, shade 'Y' for Yes and 'N' for No. In the second subset, shade 1 for parallelogram, 2 for rhombus 3 for rectangle, 4 for trapezium, 5 for square, 6 for rectangle and shade 7 if Wisden cannot form a quadrilateral.

07. Wisden has made the following matrix for Vidya and asked her to find out which boxes are wrong. Shade 'V' if no box/es is /are wrong.

		P	Q	R	S	T	U
	Quadrilateral	Opposite sides		All sides Equal	Opposite Angles Equal	Diagonals	
		Parallel	Equal			Equal	Perpendicular
(a)	Parallelogram	Yes	Yes	No	Yes	No	No
(b)	Rectangle	Yes	Yes	Yes	Yes	Yes	No
(c)	Square	Yes	Yes	Yes	Yes	Yes	Yes
(d)	Rhombus	Yes	Yes	Yes	Yes	Yes	Yes

08. The handouts given by Vidya in the class had the following key points. Which of the key points are correct? Shade 'e' if no key point is correct.
- Zero is less than every positive integer
 - Zero separates negative integers and whole numbers
 - Zero is neither negative nor positive
 - Division by zero is not defined
09. Subtraction of an integer is the same as addition of its additive inverse. Which of the following agrees with the above statement?
- $(+3) + (+2) = 5$
 - $(+2) - (-3) = (+2) + (+3)$
 - $-2 - (+3) = (3) + (-2)$
 - $(-3) + (-2) = -5$
10. Wisden called Vidya and five of his friends to his home for dinner. After dinner he gave the following number of toothpicks to each of his friends.

Alphabet that indicate the name	Name	Number of toothpicks given
P	Vidya	6

Q	Quana	5
R	Richa	4
S	Sachin	3
T	Tony	2
U	Umar	1

He asked each of them to form polygons using toothpicks they have. Shade the bubble/s with respective alphabet/s to indicate who can

- Make at least a polygon
- Form at least a curve
- Form at least a side
- Form both curve and polygon

11. Wisden was explaining Vidya about a widely circulated false proof.

Steps	Reason	Step No.
$a=b$	Given	
$a^2=ab$	Multiplication Property of Equality	P
$a^2-b^2=ab- b^2$	Subtraction Property of Equality	Q
$(a+b)(a-b)=b(a-b)$	Distributive Property	R
$a+b=b$	Division Property of Equality	S
$b+b=b$	Substitution Property	T
$2b=b$	Combination of like terms	U
$2=1$	Division Property of Equality	V

He asked Vidya to figure out the wrong step. She gave him the right answer but said one of the property given in the proof is wrong.

- Which step is wrong? Shade ' W ' if no step is wrong.
 - Which property is wrong? Shade ' W ' if no property is wrong.
12. Vidya's text book explains various properties of Whole Numbers, namely Closure property, Commutativity, Associativity, Distributivity, Identity for addition and multiplication etc. After reading and solving the sums given in the text book, Vidya has concluded the following.
- Whole numbers are closed under addition
 - Whole numbers are closed under multiplication
 - Whole numbers are closed under division
 - We can add two whole numbers in any order
 - We can multiply two whole numbers in any order
 - We can divide two whole numbers in any order
 - Whole Numbers can be associated for division
 - Whole Numbers can be associated for addition

Given the properties of whole numbers, which of the above would you disagree with Vidya? Shade 'i' if you agree with her for all the points.

13. Match the Columns

Column I		Column II
Natural Number	a	0
Prime Number	b	1
Whole Number	c	2
Even Number	d	3
Composite Number	e	4
Co prime with all numbers	f	5

14. Which of the following expressions can be rewritten using commutative property?

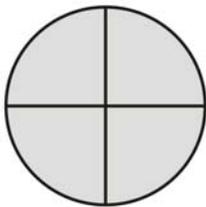
(a) $8 + 2$

(b) 6×3

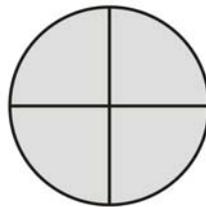
(c) $7 - 3$

(d) $18 \div 3$

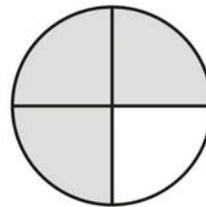
15. What fraction is the shaded part?



(a) 2



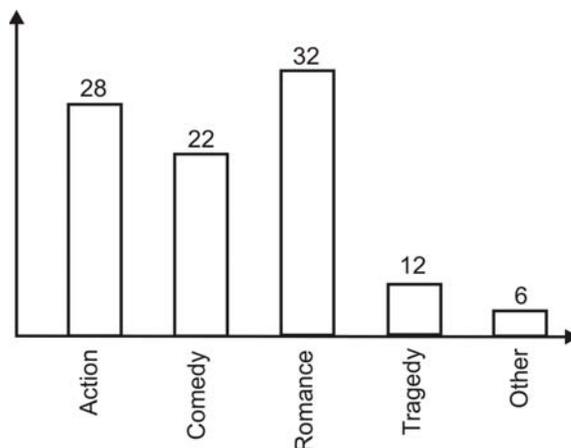
(b) $2 \frac{1}{4}$



(c) $2 \frac{3}{4}$

(d) $1 \frac{3}{4}$

16. The following graph shows sale of tickets of bollywood movies. What part of total sale is action and romance?



(a) 40

(b) 72

(c) 60

(d) 4

17. Using a graduated ruler and compasses, which of the following construction/s can be made:

(a) A circle, when the length of its radius is known.

(b) A perpendicular to a line through a point on the line.

(c) The perpendicular bisector of a line segment of given length.

(d) A line segment, if its length is given.

(e) An angle of a given measure.

(f) A copy of a line segment.

(g) The bisector of a given angle.

(h) An angle of 120°

Shade (i) if all of the above constructions can be made.

18. The temperature has dropped 15 degrees in first 30 days. Then there was no drop in temperature for 10 days. If the temperature dropped thereafter at the same rate as it was in the first 30 days, how many degrees the temperature will drop in the next 6 days?

(a) 3

(b) 5

(c) 6

(d) 7.5

19. In the following table, situation (described in ordinary language), variable used and statements using algebraic expressions are given. Shade the incorrect statement given against each situation. Shade 'f' if all the statements are right.

Options	Situation (described in ordinary language)	Variable	Statements using expressions
(a)	How old will Susan be 5 years from now?	Let y be Susan's present age in years.	Five years from now Susan will be $(y+5)$ years old
(b)	How old was Susan 4 years ago?	Let y be Susan's present age in years.	Four years ago, be $(y-4)$ years old.
(c)	Price of wheat per kg is Rs 5 less than price of rice per kg.	Let price of rice per kg be Rs p .	Price of wheat per kg is Rs $(5-p)$.
(d)	Price of oil per litre is 5 times the price of rice per kg.	Let price of rice per kg be Rs p .	Price of oil per litre is Rs $5p$.
(e)	The speed of a bus is 10 km/hour more than the speed of a truck going on the same road.	Let the speed of the truck be y km/hour.	The speed of the bus is $(y+10)$ km/hour.

20. The figure given below is a square:

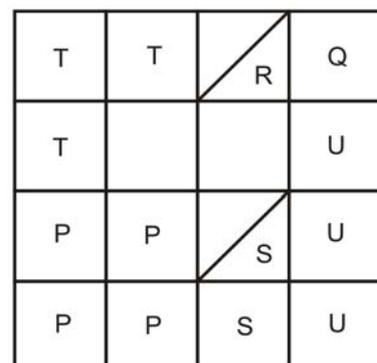
What fraction of the large square is marked P, Q, R, S, T and U?

A. $P: \frac{1}{4}$, $Q: \frac{1}{16}$, $R: \frac{1}{16}$, $S: \frac{3}{16}$, $T: \frac{3}{16}$, $U: \frac{3}{16}$

B. $P: \frac{4}{4}$, $Q: \frac{1}{16}$, $R: \frac{1}{16}$, $S: \frac{3}{32}$, $T: \frac{3}{16}$, $U: \frac{3}{16}$

C. $P: \frac{1}{4}$, $Q: \frac{1}{16}$, $R: \frac{1}{16}$, $S: \frac{3}{16}$, $T: \frac{3}{16}$, $U: \frac{3}{16}$

D. $P: \frac{1}{4}$, $Q: \frac{1}{16}$, $R: \frac{1}{32}$, $S: \frac{3}{32}$, $T: \frac{3}{16}$, $U: \frac{3}{16}$



SECTION – 2 : SCIENCE

21. After the dinner Vidya was thinking about what teacher explained her in the science class. She wrote the following points in her note book. Shade the points that are wrong.
- (a) Some of the plants are herbivores.
 - (b) All herbivores are omnivores.
 - (c) Animals in the forests eat organic food.
 - (d) Water is an essential food for growth.
 - (e) Cola and fizzy drinks are junk food.
 - (f) Nectar is an organic food.
 - (g) Honey from beehive is a processed food.
 - (h) Chocolates are not good food.

22. Wisden was worried about the news paper report that says his neighboring village has more than 30% of its people suffering from deficiency diseases. He talked to his dad's friend who is the head of the local panchayat, about the necessity of including fish and vegetable like carrots, papaya and mangos in their daily food. They have arranged work shop for the villagers on the subject. Tell us which are the deficiency diseases the villagers suffer from?
- (a) Beriberi (b) Anemia (c) Rickets (d) Loss of vision

23. After the class on fiber to fabric, Vidya's teacher asked her students to bring things that are connected to the keywords of the topic: cotton wool, fabric, fiber, knitting, spinning, weaving and yarn. Here are what they have brought:

Vidya- a pair of socks

Quana – Cotton wool

Richa – A small Charka

Tony – A piece of fabric

Sachin – A rot stem of jute plant.

The teacher asked them why they have brought those items. They have answered the following:

- (a) Vidya: The pair of socks are weaved.
- (b) Quana: Her Charka can spin yarns.
- (c) Richa: Using Cotton wool she can knit fabric in a handloom.
- (d) Tony: His piece of fabric is made from yarns.
- (e) Sachin: He can show the class how jute fibers are separated.

Which of the above statement/s is / are correct?

24. Which is the most common form of energy on earth?
- (a) Light (b) Water (c) Wind (d) Heat
25. Sepals, Petiole, petals, lamina, ovules, pistil and veins are associated with plants. Which among the above is/are not associated with flowers.

- (a) Petiole (b) Sepals (c) Pistil (d) Lamina

26. It is observed that human body has fixed joints, ball and socket joints, pivotal joints and hinge joints. Quana asked Vidya if she can tell her which among these can perform a complete circle of rotation. Vidya was puzzled a bit. Help Vidya with the right answer.
- (a) Fixed joints (b) Ball and socket joints
(c) Pivotal joints (d) Hinge joints
27. Vidya has 100 ml of saturated salt water in a jar. She would like to dissolve more salt in to the solution. What is/are the way/s by which she can make this happen?
- (a) By condensing the solution (b) By vaporizing the solution
(c) By adding water in the solution (d) By heating the solution
28. Why do we feel heat when we push our hand inside a sack of wheat?
- (a) Heat is released as a response to stimuli
(b) Heat is released due to excretion
(c) Wheat seeds store heat in them
(d) Heat is released due to respiration
29. Quana has collected some dry moong seeds. She kept a small heap of seeds aside (part 1) and soak the rest in water for a day. She has divided the soaked seeds into four parts. She kept part 2 completely submerged in water for 3-4 days. She didn't disturb the dry seeds and those submerged in water. She kept part 3 of soaked seeds in a sunny room and part 4 in a completely dark region (in a cupboard) that does not allow any light to come in. Part 5 is kept in very cold surroundings (in a refrigerator). Quana has set these parts to germinate by rinsing them and draining the water every day.
Choose the correct result/s Quana had.
- (a) Part 2 and part 3 germinates (b) Part 3 and part 4 germinates
(c) Part 4 germinates slowly (d) Part 5 remains the same.
30. Which of the following functions are the characteristics of plants and or animals:
- (a) Respire
(b) Need food
(c) Respond to stimuli
(d) Excrete
(e) Reproduce
(f) Grow
31. Vidya's teacher discussed about motion in her class. The teacher said, in some cases, the motion repeats after a certain time. Tell us what such motion is called?
- (a) Periodic Motion (b) Circular motion (c) Rectilinear motion (d) Oscillation
32. Vidya knew that light reflects. She also knew that good mirror can reflect the entire light falls on it and can give a good image. The school was preparing for Christmas celebrations. Students have decorated Santa Clause with two identical bags full of

Christmas gifts hung on both of his shoulders. Now Santa Clause looks like a symmetrical figure if we look at him face to face. Vidya, after a thought, told her teacher: "Teacher if can give me two plane mirrors of the size of Santa, I can create an illusion of infinite Santa using the theory of reflection".

Teacher asked her: Are you sure? She said yes. Teacher has arranged for two big plane mirrors identical in size and told her: "I can give you two days. If you cannot do it in a day, consult me"

But Vidya could do it in a day!

How she has created the illusion of infinite Santas? (You may try it for this Christmas)

- (a) She kept one mirror on the floor and other on the roof facing each other
 - (b) She kept one mirror in the front and other on the back facing each other
 - (c) She kept one mirror exactly on the left and other exactly on the right facing each other
 - (d) She kept the mirrors parallel to each other like in a periscope
33. Changing the colour of opaque objects does not change the colour of their shadows. What happens if we place an opaque object in coloured light? Vidya has conducted experiments to understand this and has arrived at the following conclusions.
- (a) Opaque objects are translucent.
 - (b) Opaque objects won't pass light.
 - (c) Shadows formed by opaque objects changes with the colour of light.
 - (d) Opaque objects can absorb or reflect light.
- Which of the above conclusion/s is/are right?
34. Wisden saw the following slogan pasted on the wall of power supplying company's office.
- "Switch off the light when it is bright."
- What does it mean?
- (a) You can switch a light off when it is on
 - (b) You can switch a light off when you don't need it
 - (c) You can switch a light off only when it glows
 - (d) You can switch a light off to save electricity
35. A ring magnet is placed on the table with one of its face down. Where does the North Pole and the south pole of the ring magnet lie?
- (a) North Pole towards the south and South Pole towards the north.
 - (b) South Pole towards the south and North Pole towards the north.
 - (c) The poles are formed depending on which direction we place the magnet.
 - (d) North pole on one face and south pole on the other face
36. Quana was giving a presentation to her class about "The Water Cycle". Vidya stood up and asked Quana "Can water evaporate without boiling?" Which of the following is the most appropriate answer by Quana?
- (a) Yes. It is wind that evaporates water.
 - (b) No. Water cannot evaporate without boiling
 - (c) Yes. But it requires heat for evaporation

- (d) Yes. But I need to ask our teacher.
37. Richa kept the gold fish gifted by Vidya in a bowl filled with boiled water which is cooled to room temperature. After two days she found the gold fish in the bowl is dead. What can be the possible cause of its death?
- She did not change water daily
 - Fish cannot adapt to boiled water
 - Presence of carbon dioxide in boiled water
 - Air is not present in boiled water
38. Vidya's mom was complaining about the increase in the LPG prices to Wisden. After a momentary pause, Wisden told her it is good news in some way. It is like hitting two birds with a single stone!
What are the thoughts made him comment like this?
- People will look for alternate sources of energy
 - The consumption of biogas will increase due to low cost
 - Domestic waste will be used to produce gas
 - Dumping of domestic waste will decrease to a great extent
39. A magnet was brought from different directions towards toy boats that has been floating on water in a tub. Observations are stated in Column I. Possible reasons for the observations are mentioned in Column II. Match the statements given in Column I with those in Column II. Complete the matrix by shading appropriate bubbles.

Column I		Column II	
(a)	Boat gets attracted towards the magnet	(P)	Boat is fitted with a magnet with north pole towards its head
(b)	Boat is not affected by the magnet	(Q)	Boat is fitted with a magnet with south pole towards its head
(c)	Boat moves towards the magnet if north pole of the magnet is brought near its head	(R)	Boat has a small magnet fixed along its length
(d)	Boat moves away from the magnet when north pole is brought near its head	(S)	Boat is made of magnetic material
(e)	Boat floats without changing its direction	(T)	Boat is made of non-magnetic material.

40. What does the Sun do?
- It revolves
 - It rotates
 - It is stationary
 - It emits light

SECTION 3 – GENERAL KNOWLEDGE

41. What is the content of the gas cylinders used in kitchens?
(a) Biogas (b) Oxygen (c) Methane (d) Butane
42. A googol is a large number 10^{100} ; that is, the digit 1 followed by 100 zeroes: The term was coined in 1938 by 9-year-old Milton Sirota, nephew of American mathematician Edward Kasner. Kasner popularized the concept in his 1940 book *Mathematics and the Imagination*. A famous internet company has derived its name from the word googol. Which of the following website belongs to the company?
(a) www.googol.com (b) www.facebook.com
(c) www.microsoft.com (d) www.google.com
43. Why Koodankulam is in the news for quite long?
(a) Generation of electricity (b) Extraction of nuclear fuels
(c) Anti nuclear protest (d) Nuclear energy conservation
44. Indian scientist Satyendra Nath Bose worked with Albert Einstein in the 1920s made discoveries that led to a kind of particle being named for him. It was Peter Higgs, a British physicist, who in the 1960s made advances in the field, resulting the naming of Higgs Boson. Do you know what is it popularly called?
(a) Higgs particle (b) God particle (c) Bose particle (d) Good particle
45. A dog opens its mouth and lets its tongue hang out. A human's body produces sweat. These are two ways that organisms may adjust to
(a) Cold temperatures (b) hot temperatures
(c) Mental Stress (d) Thirst

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