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Set **A**

For Class IX students (9th)

Time Allotted: 2 Hrs.

Maximum Marks : **240**

FORMULA ONE TEST

Date.:20- 11 - 2016

2nd EDITION

➢ Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

➢ You are not allowed to leave the Examination Hall before the end of the test.

INSTRUCTIONS

A. General Instructions

1. This booklet is your Question paper containing **60 questions**.
   All questions are compulsory.

2. The question paper having Scientific Aptitude, Maths & General Science.

Marking Scheme :

+4 for correct answer **NO NEGATIVE MARKS FOR WRONG ANSWER**.

3. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers, and electronic gadgets in any form are not allowed to be carried inside the examination hall.

4. Fill in the boxes provided below on this page and also write your
   Name & Enrollment No. In the space provided.

5. The answer sheet, a machine-readable (OMR), is provided separately.

6. **DO NOT TAMPER WITH/ MUTILATE THE OMR OR THE BOOKLET.**

7. Do not open the question-paper booklet before being instructed to do so by the invigilators.

B. Filling the OMR

8. On the Response sheet, write in Black Ball Point Pen, your name, your Enrollment No.and Name of the Centre. **Do not write these anywhere else.**

9. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.

10. Use Only **Black Ball Point Pen** to Darken the OMR Sheet

Name of the Candidate	— — — — — — — — — — — — — — — — —
Father's Name	— — — — — — — — — — — — — — — — —
Enrollment No.	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

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SCIENTIFIC APTITUDE

01. **If** $\dfrac{xy}{x+y} = a$, $\dfrac{xz}{x+z} = b$ **and** $\dfrac{yz}{y+z} = c$ **, where a, b and c are other than zero, then x equals:**

(a) $\dfrac{abc}{ab + ac + bc}$

(b) $\dfrac{2abc}{ab + bc + ac}$

(c) $\dfrac{2abc}{ab + bc - ac}$

(d) $\dfrac{2abc}{ab + bc - ab}$

02. **AB is a fixed diameter of a circle whose center is O, From C, any point on the circle, a chord CD is drawn perpendicular to AB. Then as C moves over a semicircle, the bisector of angle OCD cuts the circle in a point that always.**

(a) Bisects the arc AB

(b) Trisects the arc AB

(c) Is as far from AB as from D

(d) Is equidistant from B and C

03. **The diameter of a circle is divided into n equal parts. On each part a semicircle is constructed. As n becomes very large, the sum of the lengths of the arcs of the semi- circles approaches a length:**

(a) Equal to the semi-circumference of the original circle

(b) Equal to the diameter of the original circle

(c) Greater than the diameter but less than the semi-circumference of the original circle.

(d) That is infinite

04. **A line initially 1 inch long grows according to the following law, where the first term is the initial length**

$$1 + \frac{1}{4}\sqrt{2} + \frac{1}{4} + \frac{1}{16}\sqrt{2} + \frac{1}{16} + \frac{1}{64}\sqrt{2} + \frac{1}{64} + ...$$

If the growth process continues forever, the limit of the length of the line is:

(a) ∞

(b) $\dfrac{8}{3}$

(c) $\dfrac{1}{3}\left(4 + \sqrt{2}\right)$

(d) $\dfrac{2}{3}\left(4 + \sqrt{2}\right)$

05. In a rhombus ABCD line segments are drawn within the rhombus, parallel to diagonal BD, and terminated in the sides of the rhombus. A graph is drawn showing the length of a segment as a function of its distance from vertex A. The graph is:

(a) A straight line passing through the origin

(b) A straight line cutting across the upper right quadrant

(c) Two line segments forming an upright V

(d) None of these

06. Segments starting with points M and N and ending with vertices of the rectangle ABCD divide the given figure into eight parts (see the figure). The areas of three parts of the rectangle are indicated in the picture. What is the area of the shaded region?
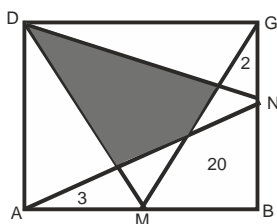
(a) 25

(b) 40

(c) 29

(d) 20

07. There is a circle of diameter AB and radius 26cm. If chord CA is 10cm long, find the ratio of area of triangle ABC to the remaining area of circle.
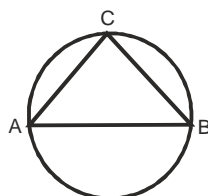
(a) 0.60

(b) 0.30

(c) 0.29

(d) 0.52

08. Three ghats X, Y and Z on the Yamuna in Delhi are located on the river bank. The speed of the river flow is 8km/h in the direction of its flow. Ghat Y being located midway between X and Z. A raft and a launch leave Y at the same time, the raft travelling down the river to Z and the launch travelling to X. The speed of the launch in still water is 5km/h. Having reached X, the launch reverses its direction and starts to Z. Find the range of values of V for which the launch arrives at Z later than the raft.

(a) $8 < V < 24$ km/h

(b) $8 < V < 16$ km/h

(c) $8 < V < 20$ km/h

(d) $12 < V < 24$ km/h

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09. On the banks of the river Ganges there are two bathing points in Varanasi and Patna. A diya left in the river at Varanasi reaches Patna in 24 hours. However, a motorboat covers the whole way in exactly 10 hours. If the speed of the motorboat in still water is increased by 40%, then it takes the motorboat 7 hours to cover the same way (from Varanasi to Patna and back again). Find the time necessary for the motorboat to sail from Varanasi to patna when its speed in still water is not increased

    (a) 3 hours

    (b) 4 hours

    (c) 4.8 hours

    (d) None of these

10. A pedestrain and a cyclist left Nagpur for Buti Bori at the same time. Having reached Buti Bori, the cyclist turned back and met the pedestrian an hour after the start. After their meeting, the pedestrian continued his trip to Buti Bori and the cyclist turned back and also headed for Buti Bori. Having reached Buti Bori, the cyclist turned back again and met the pedestrian 30 mins after their first meeting. Determine what time it takes the pedestrian to cover the distance between Nagpur and Buti Bori.

    (a) 1 hour

    (b) 2 hours

    (c) 2.5 hours

    (d) 3 hours

11. Sohan and Lallan left their house simultaneously. Thirty six minutes later, Sohan met his uncle travelling to their house, while Lallan met the uncle twelve minute after Sohan. Twenty four minutes after his meeting with Lallan, the uncle rang the door bell at Sohan and Lallan's house. Assume each person travels at a constant speed. Find the ratio of the speeds of Sohan to Lallan to the uncle.

    (a) 1 : 2 : 2

    (b) 1 : 3 : 2

    (c) 3 : 1 : 3

    (d) 2 : 1 : 2

12. How many times will the digit 6 be used when we write all the six digit numbers?

    (a) 5,50,000

    (b) 5,00,000

    (c) 4,50,000

    (d) 4,00,000

13. The function f(x) is defined for positive integers and is defined as:

f(x) = 6^x –3, if x is a number in the form 2n.

= 6^x + 4, if x is a number in the form 2n + 1

What is the remainder when f(1) + f(2) + f(3) + ...+f(1001) is divided by 2?

    (a) 1

    (b) 0

    (c) –1

    (d) None of the above

14. For a positive integer x, $f(x + 2) = 3 + f(x)$, when x is even and $f(x+2) = x + f(x)$, when x is odd. If $f(1) = 6$ and $f(2) = 4$, then find $f(f(f(f(1)))) + f(f(f(f(2))))$.

(a) 1375

(b) 1425

(c) 1275

(d) None of these

15. Consider two figures A and D that are defined in the coordinate plane. Each figure represents the graph of a certain function as defined below :

$$A : |X| - |Y| = a$$
$$D : |Y| = d$$

If the area enclosed by A and D is 0, Which of the following is a possible value of (a,d) ?
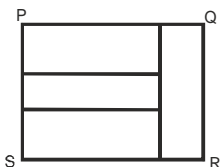
(a) (2,1)

(b) (-2,1)

(c) (-2,3)

(d) 2,3)

MATHEMATICS

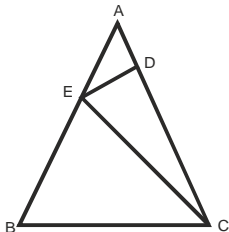**16.** Find the 28383rd term of the series: 123456789101112....

(a) 3

(b) 4

(c) 9

(d) 7

17. Rectangle PQRS contains 4 congruent rectangles . If the smaller dimension of one of the small rectangles is 4 units. What is the area of rectangle PQRS in square units?

(a) 144

(b) 172

(c) 156

(d) 192

18. **Find angle EBC + angle ECB from the given figure, given ADE is an equilateral triangle and angle DCE = 20°**

   (a) 160

   (b) 140

   (c) 100

   (d) 120

19. **PQRS is a square and POQ isan equilateral triangle. What is the value of SOR?**
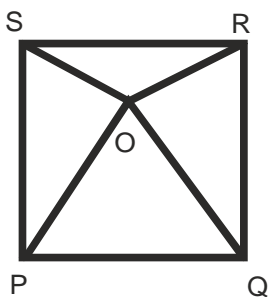
   (a) 150

   (b) 120

   (c) 125

   (d) 100

20. **In the figure $AB \parallel DE$, angle BAD = 20° and angle DAE = 30°, and DE = EC. Then x equals.**

   (a) 60

   (b) 65

   (c) 75

   (d) 70

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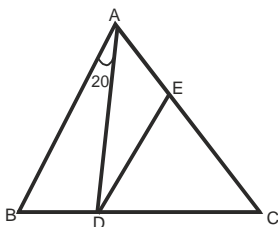
21. In the figure (not drawn to scale) given below, L is a point on AB such that AL : LB = 4:3. LQ is parallel to AC and QD is parallel to CL. In $\triangle ARC$, $\angle ARC = 90^\circ$, and in $\triangle LQS$, $\angle LSQ = 90^\circ$. What is ratio AL : AD?
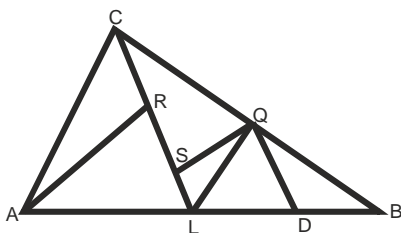
   (a) 3:7

   (b) 4:3

   (c) 7:3

   (d) 8:3

22. Find the last digit of the number $1^3 + 2^3 + 3^3 + 4^3 \ldots + 99^3$.

   (a) 0

   (b) 1

   (c) 2

   (d) 5

23. Suppose the sum of n consecutive integers is $x + (x+1) + (x + 2) + (x + 3) + \ldots + (x+(n-1)) = 1000$, then which of the following cannot be true about the number of term n.

   (a) The number of terms can be 16

   (b) The number of terms can be 5

   (c) The number of terms can be 25

   (d) The number of terms can be 20

24. $10^n - \left(5 + \sqrt{17}\right)^n$ is divisible by 2^{n+2} for what whole number value of n?

   (a) 2

   (b) 3

   (c) 7

   (d) None of these

25. If m and n are roots of this quadratic equation $x^2 + 2x - 8 = 0$ and the roots of $x^2 + 10x - 16p = 0$ are 3m and 4n, then the value of 'p' is:

   (a) –6

   (b) 6

   (c) 7

   (d) 8

26. **If α and β are the roots of the equation $x^2 + x + k = 0$ then $\left(\dfrac{\alpha - 1}{2}\right)\left(\dfrac{\beta - 1}{2}\right)$ is:**

   (a) k

   (b) $\dfrac{k - 1}{2}$

   (c) $\dfrac{k + 1}{2}$

   (d) $\dfrac{k + 2}{4}$

27. **The roots of the quadratic equation $x^2 - 2015x + k = 0$ are prime numbers, then k is equal to :**

   (a) 4022

   (b) 4026

   (c) 2017

   (d) 2016

28. **If A (5, 3), B (11, –5) and P (12, y) are the vertices of a right triangle right angled at P, then y =**

   (A) –2, 4

   (B) –2, –4

   (C) 2, –4

   (D) 2, 4

29. **If the area of the triangle formed by the points (x, 2x), (–2, 6) and (3, 1) is 5 square units, then x =**

   (A) $\dfrac{2}{3}$

   (B) $\dfrac{3}{5}$

   (C) 3

   (D) 5

30. **If the centroid of the triangle formed by (7, x), (y, –6) and (9, 10) is at (6, 3) then (x, y) =**

   (A) (4, 5)

   (B) (5, 4)

   (C) (–5, –2)

   (D) (5, 2)

GENERAL SCIENCE

31. **While walking on ice, one should take small steps to avoid slipping. This is because smaller steps ensure:**

(a)   Larger friction

(b)   Smaller friction

(c)   Larger normal force

(d)   Smaller normal force

32. **In the arrangement shown in figure Pulley A and B are massless and the thread is inextensible. Mass of pulley C is equal to m. If friction in all the pulleys is negligible, then:**
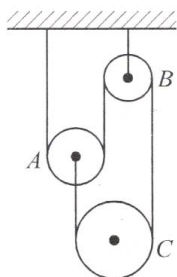
(a)   Tension in thread is equal to 1/2 mg.

(b)   Acceleration of pulley C is equal to g/2 (downward)

(c)   Acceleration of pulley A is equal to g/2 (upward)

(d)   Acceleration of pulley A is equal to 2g (upward)

33. **A block A kept on an inclined surface just begins to slide if the inclination is 30^0. The block is replaced by another block B and it is found that it just begins to slide if the inclination is 40^0 :**

(a)   Mass of A > mass of B

(b)   Mass of A < mass of B

(c)   Mass of A = mass of B

(d)   All the three are possible

34. When the force of constant magnitude always act perpendicular to the motion of particle then :

(a)   Velocity is constant

(b)   Acceleration is constant

(c)   K.E is constant

(d)   None of these

35. **Essential characeristic of equlibrium is :**

(a) Momentum equal zero

(b) Acceleration equals zero

(c) K.E. equals zero

(d) Velocity equals zero

36. **The ratio of acceleration due to gravity at a depth h below the surface of earth and at a height h above the surface of earth for h << radius of earth:**

(a) Is constant

(b) Changes linearly with h

(c) Changes parabolically with h

(d) Decreases

37. **A uniform spherical shell gradually shrinks maintaining its shape and its wall thickness.The gravitational potential at the centre:**

(a) Increase

(b) Decrease

(c) Remains constant

(d) Oscillates

38. **A ball is projected vertically up with an initial velocity.**

Which of the following graphs represents the KE of the ball?

(a)

(b)

(c)

(d)
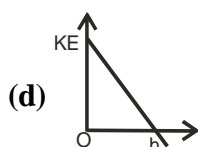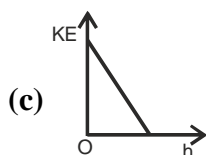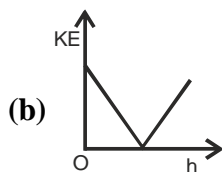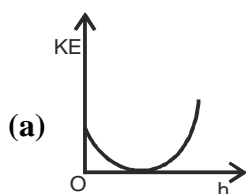
39. **A truck travelling due north at 20 m/s turns east and travels at the same speed . What is the change in velocity:**

   (a)   40 m/s north east

   (b) $20\sqrt{2}$ m/s south east

   (c) $20\sqrt{2}$ m/s south west

   (d) $20\sqrt{2}$ m/s north west

40. **Three particles A,B and C are thrown from the top of a tower with the same speed . A is thrown straight up,B is thrown straight down and C is thrown horizontally .They hit the ground with speeds V_A , V_B and V_C respectively :**

   (a) $V_A = V_B = V_C$

   (b) $V_A > V_B > V_C$

   (c) $V_A = V_B > V_C$

   (d) $V_A > V_B = V_C$

41. **Which of the following do not have the same number of valence electrons?**

   (a) H, Li, Na, K   (b) B, Al, N, P   (c) He, Mg, Be, Ca   (d) O, S, Cl

42. **While performing cathode ray experiments, it was observed that there was no passage of electric current under normal conditions. Which of the following can account for this observation?**

   (a)   Dust particles are present in air

   (b)   Carbon dioxide is present in air

   (c)   Air is a poor conductor of electricity under normal conditions

   (d)   None of the above

43. **Which of the following statements about Rutherford's model of atom are correct?**

   (i)   Considered the nucleus as positively charged

   (ii)   Established that the α – particles are four times as heavy as a hydrogen atom

   (iii)   Can be compared to solar system

   (iv)   Was in agreement with Thomson's model

   (a)   (i), (ii) and (iii)

   (b)   (ii) and (iii)

   (c)   (i) and (iv)

   (d)   only (i)

44. **A certain sample of element Z contains 60% of ^{69}Z and 40% of ^{71}Z. What is the relative atomic mass of element Z in this sample?**

    (a)   69.2

    (b)   69.8

    (c)   70.0

    (d)   70.2

45. **Carbon tetra chloride and benzene are --**

    (a)   Immiscible liquid

    (b)   Miscible liquid

    (c)   Both (a) and (b)

    (d)   None of these

46. **Which of the following statements is not true about suspension?**

    (a)   The particles of suspension can separated from solvent by the process of filtration

    (b)   When the suspension is kept undisturbed then the particles of suspenstion settle down.

    (c)   A suspension is homogenous in nature

    (d)   Scattering of particles take place in suspension

47. **Which of the following statements best explains why a closed balloon filled with helium gas rises in air?**

    (a)   Helium is a monatomic gas, where as nearly all the molecules that make up air, such as nitrogen and oxygen, are diatomic

    (b)   The average speed of helium atoms is higher than the average 'speeds of air molecules, and the higher speed of collisions with the balloon walls propels the balloon upward

    (c)   Because the helium atoms are of lower marks than the average air molecules, the helium gas is less dense than air. The balloon thus weighs less than the air displaced by its volume

    (d)   Because helium has a lower molar mass than the average air molecule, the helium atoms are in faster motion. This means that the temperature of the helium is higher than the air temperature. Hot gases tend to rise.

48. **Two chemical species X and Y combine together to form a product P which contains both X and Y**

    $$X + Y \rightarrow P$$

    X and Y cannot be broken down into simpler substances by simple chemical reactions. Which of the following concerning the species X, Y and P are correct?

    (i) P is a compound   **(ii) X and Y are compounds**

    (iii) X and Y are elements   **(iv) P has fixed composition**

    (a)   (i), (ii) and (iii)

    (b)   (i), (ii) and (iv)

    (c)   (ii), (iii) and (iv)

    (d)   (i), (iii) and (iv)

49   **An atom having atomic mass number 13 and 7 neutrons. What is the atomic number of the atom ?**

(a)   5

(b)   6

(c)   20

(d)   None of these

50   **Atoms of difference elements that have same mass number but different atomic number are called :**

(a)   Isotopes

(b)   Isotones

(c)   Isobars

(d)   None of these

51.   **Which of the following is an example of a single cell that does not function as a full-fledged organism?**
   1. White blood cell (WBC)   2. Amoeba
   3. WBC and Amoeba   4. Paramecium

(a)   2 only

(b)   2 ,4

(c)   1 only

(d)   3, 4

52.   **$F_0 - F_1$ particles are also called as**

(a)   Quantasomes

(b)   Glyoxysome

(c)   Palada particles

(d)   Oxysomes

53.   **Quantasomes are found in**

(a)   Mitochondria

(b)   Chloroplast

(c)   Nucleus

(d)   Lysosome

54.   **Which one of the following cellular part is correctly described?**

(a)   Thylakoids - flattened membranous sacs forming the grana of chlroplasts

(b)   Centrioles - sites for active RNA synthesis

(c)   Ribosomes - those on chloroplasts are larger (80s) while those in the cytoplasm are smaller (70s)

(d)   Lysomes - optimally active at a pH of about 8.5

55.   **Collenchyma is absent in**

(a) Root

(b) Dicot Stem

(c) Monocots

(d) Both (a) & (c)

56. **What happens when a cell placed in hypertonic solution?**
(a) Endosmosis
(b) Exosmosis
(c) Deplasmolysis
(d) Imbibition

57. **Find out the correct ones in the following table:**

	TISSUE STRUCTURE	FEATURES	FUNCTION
1.	Collenchyma	Cell wall with water content	Photosynthesis in young stems
2.	Parenchyma	Suberised cell walls	Storage of food
3.	Sclerenchyma	Lignified cell walls	Mechanical strength
4.	Digestive glands	Dense cytoplasm without water	Breaking substrate

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

58. **Ciliated epithelium occurs in**
(a)   Trachea and lungs
(b)   Trachea and liver
(c)   Bronchioles and fallopian tubes
(d)   Bronchioles and lungs

59. **Which of the following is set of connective tissue only?**
(a)   Blood, Bone, Skin
(b)   Blood, Bone, Muscle
(c)   Bone, Tendon, Muscle
(d)   Cartilage, Bone, Blood

60. **The largest sized RBCs have been seen in**
(a)   Elephant
(b)   Whale
(c)   Amphiuma
(d)   Man

End is not the end,

    If fact E.N.D. means

        "EFFORT NEVER DIES"

        — Dr. A.P.J. Abdul Kalam

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