ALL INDIA SAINIK SCHOOL ENTRANCE EXAMINATION : 2014

PAPER I – MATHEMATICS AND SCIENCE

CLASS –IX

Time: $2\frac{1}{2}$ hrs **Max Marks: 275**

Notes:-

(a). This paper contains two parts – Part 'A' is Mathematics and Part 'B' is Science. You are required to attempt ALL questions in each part.

(b). Part 'A' – (Mathematics) bearing 50 questions. Marks are indicated against each question.

(c). Part 'B' – (Science) contains 37 questions. Marks are indicated against each question.

(d) Rough work is to be done at space provided only.

(e) Write all your answers in **Blue or Black** ink only. Do not use pencil.

(f). This booklet contains 30 pages.

PART 'A' : MATHEMATICS

(Total Marks : 200)

Instructions: Q1 to Q20 bear 2 marks each **(2x20=40)**

Q1. Find two rational numbers between $\frac{1}{4}$ and $\frac{3}{8}$ and represent them in number line.

Q2. Simplify $\frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$

Q3. Fifteen years from now Mohan's age will be times his present age. What is Mohan's age after five years from now.

Q4. Find the least number of three digits which is greater than 100 and a perfect square.

Q5. Find the value of $x^3 - \frac{1}{x^3}$, given $x - \frac{1}{x} = 7$

Q6. Resolve into factors:

$$17 - 32y - 4y^2$$

Q7. Find the cube root of 91125.

Q8. There are certain number of row of trees in a garden. The number of trees in each row is twice the number of rows. If the number of trees in the garden is 1250, then the number of rows in the garden is _____.

Q9. The marked price of an item is Rs 1200. Find the discount percentage allowed on the item if it is sold for Rs.1050.

Q10. A man borrowed Rs 16000 at 10% per annum interest compounded half yearly. Find the amount repayable after one year.

Q11. The four angles of a quadrilateral are in the ration 1:2:3:4. Find the measures of the angles.

Q12. What must be added to $4x^2 - 12x + 7$ to make it a whole square.

Q13. $(129^8)^9$ is equal to

(a) 129^{17} (b) 129^2 (c) 129^{72} (d) 129^0

Q14. The mean of the first ten natural numbers is

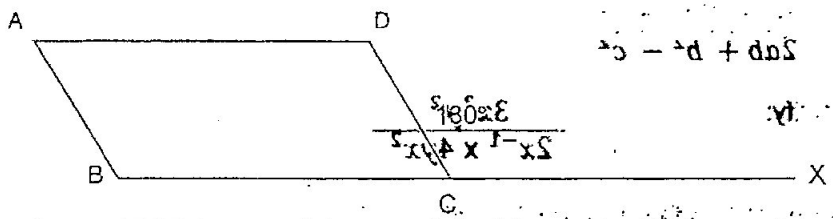
(a) 5.10 (b) 5.5 (c) 5 (d) 6.2

Q15. Divide a sum of Rs 10 between two persons A and B such that A gets Rs 1 more than B.

Q16. The sum of two numbers is 45 and their ratio is 7:8. Find the numbers.

Q17. If 56 men can do a piece of work in 42 days, how many men will do it in 14 days?

Q18.



In the above figure, ABCD is a parallelogram, find all the angles of the parallelogram if measure of angle DCX = 130°.

Q19. A man loses 20% of his money. After spending 25% of the remainder, he has Rs.480.00 left. How much money did he originally have?

Q20. By selling a towel for Rs. 126.90 a shopkeeper loses 6%. For how much should he sell the towel to gain 4%.

Instructions: Q 21 to Q 40 bear 3 marks each **(3x20=60)**

Q22. The digits of a two digit number are such that one is twice the other. When the digits are interchanged, the new number obtained is greater than the original number by 27. Find the number.

Q23. Solve $\frac{2x-1}{6} - \frac{3x+2}{3} = \frac{1}{3}$

Q24. Evaluate:

$$\left[\left\{\frac{(-\frac{1}{3})^4}{(-\frac{1}{3})^8}\right\} \times (-\frac{1}{3})^5\right]$$

Q24. If $a^2 + \frac{1}{a^2} = 27$, then find the value of $a - \frac{1}{a}$

Q25. A well is dug 20m deep and has a diameter of 7m. The earth which is so dug out is spread evenly on a rectangular plot 22m long and 14 m broad. What is the height of the platform formed?

Q26. Find the area in sq cm of a rhombus whose side is 17cm and one of its diagonals is 30cm.

Q27. The marks obtained by 40 students in Mathematics are given below:
69, 59, 49, 39, 84, 68,77, 48, 47, 57, 46, 41,44, 67, 57, 45, 34, 36, 87, 89, 65, 41, 84, 78, 52, 49, 75, 37, 38, 42, 73, 31, 34, 37, 56, 59, 64, 85, 81 and 62.
Based on the above data, the frequency of the class 60-70 is _____.

Q28. An article with a marked price of Rs 600 is available at a discount of 18%. Find the discount given and also the price at which the article is available for sale.

Q29. If $5^{3x+4} = 25 \times 5^{4x-1}$ find the value of x.

Q30. Walking at 4 km an hour, a person reaches his office 5 minutes late. If he walks at 5 km an hour, he will be 4 minutes too early. Then the distance of his office from his residence is _____.

Q31. The internal measures of a cuboidal room are 12m x 8m x 4m. Find the total cost of whitewashing all four walls of the room, if the cost of whitewashing is Rs 5 per square metre. What will be the cost of whitewashing if the ceiling of the room is also whitewashed?

Q32. What least number must be subtracted from 2200 so as to get a perfect square?

Q33. A garrison of 2000 men has a provision for 15 weeks. How many men must leave so that the same provision my last for 20 weeks?

Q34. Multiply $(a^2 + b^2 + c^2 - ab - bc - ca)$ by $(a + b + c)$

Q35. Construct a histogram for the frequency distribution below:

Class Interval	20-30	30-40	40-50	50-60	60-70
Frequency	5	8	3	6	7

Q36. Solve $\left\{\frac{(\frac{56}{28})^0}{(\frac{2}{5})^3}\right\} \times (\frac{16}{25})$

Q37. Pipe A can fill a tank in 14 minutes, pipe B can fill it in 7 minutes and pipe C can empty the full tank in 28 minutes. If all of them are opened simultaneously, find the time taken to fill the empty tank.

Q38. Four pipes 5 cm each in diameter are to be replaced by a single pipe discharging the same quantity of water. If the speed of water remains same in both the case, find the diameter of the single pipe.

Q39. Reduce the following expression into lowest term.

$$\frac{a^2 - b^2 - 2bc - c^2}{a^2 + 2ab + b^2 - c^2}$$

Q40. Simplify:

$$\frac{3x^2y^2}{2x^{-1} \times 4yx^2}$$

Instructions: Q41 to Q 50 bear 10 marks each **(10x10=100)**

Q41. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank which is 20 m long, 15m broad and 6 m high. For how many days will the water of this tank last? Given 1 m^3 = 1000 litres.

Q42. The sum of the ages of a father and his son is 50 years. 5 years ago father's age was 7 times the son's age. Find their present ages.

Q43. (a) Solve the linear equation $x - 0.3 + 0.05x = 2 - 1 - 4x$

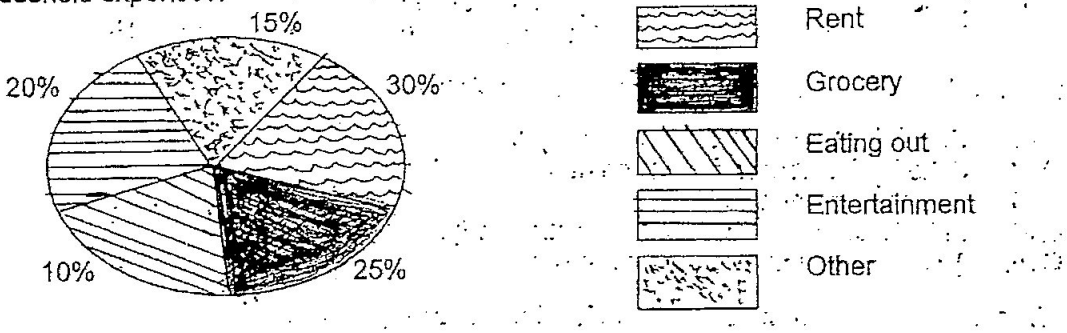
(b) The sum of the digits of a certain two digits number is 7. Reversing its digits increases the number by 9. What is the number?

Q44. Construct a trapezium ABCD in which AB & CD are parallel, AB=6cm, DC = 3.5cm $\angle A = 55°$, AD = 3.5cm.

Q45. Parikshit made a cuboid of plasticine having dimensions 2cm, 5cm, 5cm. What is the minimum number of such cuboid required to make a cube?

Q46. A horse is tethered in a corner of a rectangular plot 40m by 36m with a rope 14m long. Find the area over which it can graze.

Q47. The pie chart below shows how Mr. Davis distributes his monthly income into different household expenses.



(a) In which of the above categories does Mr. Davis spend the greatest portion of his income?
(i) Grocery (ii) Entertainment (iii) Eating out (iv) Rent

(b) What portion of the monthly income does Mr. Davis spend on entertainment?
(i) 10% (ii) 20% (iii) 30% (iv) 25%

(c) What fraction of the monthly income does Mr. Davis spend on groceries?
(i) $\frac{1}{4}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{10}$ (iv) $\frac{3}{4}$

(d) If Mr. Davis earns Rs 2,000/- per month, how much does he spend on groceries?
(i) Rs 1,000 (ii) Rs 250 (iii) Rs 500 (iv) Rs 700

(e) What is the ratio of expenditure between entertainment and grocery?
(i) 3:4 (ii) 4:5 (iii) 3:5 (iv) none of these

Q48. A man bought a TV and washing machine for Rs 8000 each. He then sold the TV at a loss of 4% and the washing machine at a profit of Rs 8%. Find the overall gain or loss percent in the whole transaction.

Q49. Factorise the following:
(a) $m^2 + n - mn - m$
(b) $x^4 + 12x^2 + 64$

Q50. (a) Solve $(4x^2 + 7x^3y^2) - (-6x^2 - 7x^3y^2 - 4x) - (10x + 9x^2)$
(b) Using the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$
Solve 107 x 108

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PART 'B' : SCIENCE

Note: Part B contains 37 questions, bearing 75 marks. Question No. 1 to 15 are multiple choice questions carrying 1 mark each, Question No 16 to 25 carry 2 marks each, Question No. 26 to 35 carry 2 marks each, Question No. 36 & 37 carry 5 marks each.

For Q1 to Q15, do as directed **(1x15=15)**

Fill in the blanks.

Q1. Blue green algae fix _____ directly from air to enhance fertility of soil.
Q2. Species found only in a particular area is known as _____.
Q3. Synthetic fibres are synthesized from raw material called _____.
Q4. Phosphorus is a very _____ non metal.
Q5. Process of separation of different constituents from petroleum is called _____.

Select the correct Answer.

Q6. The most common carrier of communicable diseases is
(a) Ant (b) Housefly (c) Dragonfly (d) Spider

Q7. Which of the following can be beaten into thin sheets
(a) Zinc (b) Phosphorus (c) Sulphur (d) Oxygen

Q8. Unwanted sound is called as
(a) Music (b) Pitch (c) Noise (d) Shrill

Q9. The process of depositing a layer of any desired metal on another material by means electricity is called.
(a) Mixing (b) Electrolyting (c) Electroding (d) Electroplating

Q10. Which of the following is NOT a planet of the sun?
(a) Sirius (b) Mercury (c) Saturn (d) Earth

Mark 'T' if the statement is True and 'F if it is False.

Q11. Generally, non metals react with acids. ( )
Q12. Coke is almost pure form of carbon. ( )
Q13. Kerosene is not a fossil fuel. ( )
Q14. Unicellular organisms have one celled body. ( )
Q15. An embryo is made up of a single cell. ( )

Write answers within the space provided under the questions:- **(2x10=20)**

Q16. Does pure water conduct electricity? If not what can we do to make it conductive.
Q17. Explain why gliding friction is less than static friction.
Q18. A pendulum oscillates 40 times in 4 seconds. Find its time period and frequency.
Q19. Define
(a) Force of Gravity .....
(b) Pressure .....
Q20. Define adolescence
Q21. Give two differences between Zygote and foetus
Q22. Nylon is used for making parachutes, car seat belts and ropes for rock climbing. Why?
Q23. List condition under which combustion can take place.
Q24. List two advantages of using CNG & LPG as fuels.
Q25. What is malleability? Give two examples of malleable metals.

Write answers within the space provided under the questions:- **(3x10=30)**

Q26. What is Marble Cancer? Write the air pollutants that are affecting the beauty of Tajmahal.
Q27. Why is the distance between stars is is expressed in light years? What do you understand by the statement that a star is eight light away from the earth?
Q28. Explain why plastic containers are favoured for storing food?
Q29. What are the major groups of micro organisms?
Q30. What is constellation? Name any two constellation.
Q31. Explain the reason why water is not used to control fires involving electrical equipment?
Q32. Why Sodium and Potassium are stored in kerosene?
Q33. Why are children / infants given vaccination?
Q34. Briefly explain types of combustion.
Q35. Draw labeled diagrams of plant cell and animal cell
Q36. Write short notes on
(a) Cytoplasm.
(b) Nucleus of a Cell
Q37. Briefly answer the following questions.
(a) Why porters place a round piece of cloth on their head when they have to carry a heavy load? (3 marks)
(b) An inflated balloon was pressed against a wall after it had been rubbed with a piece of synthetic cloth. It was found that, the balloon sticks to the walls. What force might be responsible for attraction between the balloon and the wall? (2 marks)
(c)

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