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OFFLINE EXAMINATION (PHASE –II)

CLASS-IX

M.M. 70 **TIME: 70 Minutes**

Name :_____ Regn. No_____ Mobile No._____

General Instructions:-

1. Duration of the examination is 70 Minutes. Question Paper contains 70 questions with maximum 70 marks.
2. **There will be negative marking in Phase -II i.e: ¼ mark will be deducted for each incorrect answer.**
3. Use of gadgets is not allowed.
4. Students must abide by the instructions issued during the examination by the invigilator or the centre incharge.
5. Before attempting the question paper ensure that it contains all pages & no question is missing.
6. Immediately fill the particulars on this page of the test booklet with blue/black ball point pen. Use of pencil is strictly prohibited.
7. Darken the bubbles completely. Do not put a tick ☑ or a cross ☒. Fill the bubbles completely.
8. Half –filled or over-filled bubbles will not be read by the software & liable to be rejected.

Correct Method

Wrong Method

Student's Signature

Invigilator's Signature

ALL INDIA RPS OLYMPIAD-2022

(Organized by RPS Education Society Mahendergarh-Haryana)

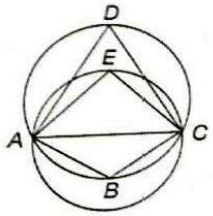
M.M. 70 **Class -IX** **Time: 70 Minutes**

English (10)

1. _____ he become a poet, he would write an epic. **(Fill the gap by choosing correct option.)**
   (a) If (b) Would (c) Should (d) will
2. No teacher and no student _____ present there. **(Fill the gap by choosing correct option.)**
   (a) were (b) was (c) are (d) have
3. John was the only _____ qualify the test. **(Fill the gap by choosing correct option.)**
   (a) who (b) that (c) had (d) to
4. My brother often watches television _____ late _____ night. **(Fill the gap by choosing correct option.)**
   (a) before, in (b) until, in (c) until, at (d) before, of
5. A boy is sitting in the <u>waiting</u> room. **(Identify the underlined verb by choosing correct option)**
   (a) Participle (b) Gerund (c) Infinitive (d) Finite verb
6. Last night some thieves broke into my house, a lot of gold and clothes took away. **(Find incorrect part of the sentence by choosing correct option)**
   (a) Last night some thieves broke into my house, (b) a lot of gold and clothes
   (c) took away (d) No error
7. I said to the passenger, "You have no ticket, get out before you are driven out." **(Change into indirect speech)**
   (a) I ordered the passenger to get out before he was driven out.
   (b) I told the passenger to get out before he was driven out as he had no ticket.
   (c) I told the passenger get out before you were driven out as you had no ticket.
   (d) I told the passenger that he had no ticket and he should get out before he was driven out.
8. People say that he is a spy. **(Change into passive Voice)**
   (a) It has been said by people that he is a spy. (b) It is said by people that he is a spy.
   (c) It was said that he is a spy. (d) It is said that he is a spy.
9. At the police station, he <u>showed a clean pair of heels</u>. **(Choose the correct option which best expresses the meaning of the underlined Idiom / Phrase in the given sentence)**
   (a) displayed clean heels (b) kneeled down (c) ran away (d) showed courage
10. He has gone to Delhi <u>where his brother lives</u>. **(Identify the underlined clause by choosing the Correct option)**
    (a) Adverb clause of place (b) Adjective clause (c) Noun clause (d) Principal clause

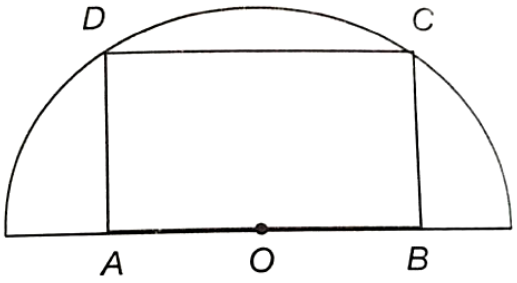
Mathematics (20)

11. In this given figure, AC is the diameter of the circle on which the point E lies. A, B, C and D are concyclic. If $\angle ADC = 55^\circ$, find the sum of $\angle DAE$ and $\angle DCE$.



(a) 35° (b) 55° (c) 45° (d) 65°

12. In the given figure, ABCD is a rectangle inscribed in a semi-circle. If the length and the breadth of the rectangle are in the ratio 2 : 1. What is the ratio of the perimeter of the rectangle to the diameter of the semicircle?



(a) $3:\sqrt{2}$

(b) $2:\sqrt{3}$

(c) $2:\sqrt{5}$

(d) $3:\sqrt{5}$

13. Solve the equations: $4(2^{x-1}) + 9(3^{y-1}) = 17$ and $3(2^x) - 2(3^y) = 6$

(a) $(x, y) = (-2, -1)$ (b) $(x, y) = (2,1)$

(c) $(x, y) = (1,2)$ (d) $(x, y) = (2, -1)$

14. X is a three-digit number. The number formed by reversing the digits of X is 891 less than X. Find its units digit.

(a) 0 (b) 1 (c) 2 (d) Cannot be determined

15. The square root of $(3a + 2b + 3c)^2 - (2a + 3b + 2c)^2 + 5b^2$ is

(a) $\sqrt{5}\,(a + b + c)$ (b) $\sqrt{5}\,(a + b)$ (c) $\sqrt{5}\,(a + c)$ (d) $\sqrt{5}\,(a + c - b)$

16. $\left(\sum_{x,y,z} x\right)^2 - \left(\sum_{x,y,z} x^2\right) =$ _____.

(a) $\left(\sum_{x,y,z} x\right)$ (b) $2\left(\sum_{x,y,z} xy\right)$ (c) $\pi \begin{matrix} xy \\ x, y, z \end{matrix}$ (d) $2\left(\sum_{x,y,z} x + y\right)$

17. If the LCM of the polynomials $(y - 3)^a(2y + 1)^b(y + 13)^7$ and $(y - 3)^4(2y + 1)^9\,(y + 13)^c$ is

$(y - 3)^6(2y + 1)^{10}\,(y + 13)^7$, then the least value of $a + b + c$ is

(a) 3 (b) 10 (c) 16 (d) 23

18. Find the square root of $(x-1)(x-2)(x-3)(x-4)+1$.

(a) x^2+5x-5 (b) x^2+5x+5 (c) x^2-5x-5 (d) x^2-5x+5

19. A certain sum of money triples itself in 6 years at compound interest. In how many years will it become 27 times at the same rate of compound interest?

(a) 27 (b) 30 (c) 24 (d) 18

20. Amish sold an article at two-thirds of the marked price and suffered a loss of $16\frac{2}{3}\%$. Find the percentage of profit, if he sold the article at the marked price.

(a) 20% (b) 25% (c) $16\frac{2}{3}\%$ (d) $33\frac{1}{3}\%$

21. In a business, P, Q and R are three partners. Thrice P's investment is equal to twice Q's investment and R's investment is equal to twice P's investment. Q's period of investment is $\frac{4}{3}$ times P's period of investment and is twice R's period of investment. If the total profit at the end of the year is Rs. 52,000, find the sum of the shares of P and Q in the profit. (in Rs.)

(a) 32,000 (b) 36,000 (c) 40,000 (d) 28,000

22. Two positive numbers x and y satisfy the condition $4x^2+25y^2=20xy$. Find the value of $x:y$.

(a) 5 : 2 (b) 2 : 5 (c) 3 : 2 (d) 2 : 3

23. If $x=\frac{1}{2-\sqrt{3}}$, the value of $x^3-2x^2-7x+10$ is equal to

(a) $2+\sqrt{3}$ (b) 10 (c) $7+2\sqrt{3}$ (d) 8

24. If $x=1+5^{\frac{1}{3}}+5^{\frac{2}{3}}$, then find the value of $x^3-3x^2-12x+6$.

(a) 22 (b) 20 (c) 16 (d) 14

25. If $\sum_{k=4}^{143}\frac{1}{\sqrt{k}+\sqrt{k+1}}=a-\sqrt{b}$, then a and b respectively are $2\left(\sum_{x,y,z}x\right)-\left(\sum_{x,y,z}x^2\right)=$ _____.

(a) 10 and 0 (b) -10 and 4 (c) 10 and 4 (d) -10 and 0

26. The surd $\frac{12}{3+\sqrt{5}+2\sqrt{2}}$, after rationalizing the denominator becomes

(a) $\sqrt{5}+\sqrt{10}+\sqrt{2}+1$ (b) $\sqrt{5}-\sqrt{10}+\sqrt{2}+1$

(c) $\sqrt{10}+\sqrt{2}+\sqrt{5}+1$ (d) $\sqrt{5}-\sqrt{10}-\sqrt{2}+1$

27. The mean of first n odd natural numbers is $\frac{n^2}{81}$ Find n

(a) 9 (b) 81 (c) 27 (d) None of these

28. A cylinder tub of radius 12 cm contains water to a depth of 20 cm. A spherical ball is dropped into the tub and thus the level of water is raised by 6.75 cm. What is the radius of the ball?

(a) 6 (b) 7 (c) 8 (d) 9

29. From a point within an equilateral triangle, perpendiculars are drawn to its sides. The length of these perpendiculars are 6 m, 7 m and 8 m. The area of the triangle is

(a) 160 sq. m (b) $210\sqrt{3}$ sq. m. (c) $147\sqrt{3}$ sq. m. (d) $27\sqrt{3}$ sq. m.

30. If a leap year is selected randomly then what is the probability of having 53 Monday in this year.

(a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{4}{7}$

Social Science (10)

31. Hitler's historic blunder was attack on USSR. The code given to this attack was known as:-

(a) Operation Sea lion (b) Operation Blue Star

(c) Operation Barbarossa (d) Operation Central Power

32. The Great depression was a period of

(a) Political crisis (b) Social crisis (c) Global crisis (d) Economic crisis

33. Why was the Weimar Republic called 'November criminals'?

(a) Because they signed armistice agreement and concede Germany to allies.

(b) Because they crushed spartacists with the help of free corps.

(c) Because they misused article 48.

(d) They secured loans from USA.

34. Which category of poor includes both 'Always' and 'usually' poor.

(a) churning poor (b) Transient poor (c) Seasonal poor (d) chronically poor

35. Which approach is used by the government to overcome the problem of poverty?

(a) Growth oriented Approach (b) Poverty Alleviation programme

(c) Meeting the minimum needs of the poor (d) All of these

36. Which of the following statement is/are correct about 'La Nina'

(a) It derives its name from Spanish word which means 'Girl-Child'

(b) It is the opposite ENSO phase to EL Nino

(c) Only A

(d) Both A & B

37. In winter the western cyclonic disturbance originate from which sea?

(a) Arbian Sea (b) Mediterranean Sea (c) Indian Sea (d) Caspian Sea

38. When was the voting age reduced from 21 to 18 years in India?

(a) 1986 (b) 1987 (c) 1988 (d) 1989

39. Who is the present Chief Election Commissioner of India?

(a) Sunil Arora (b) Ranjan Gogai (c) Sushil Chandra (d) None of these

40. Council of States in India can delay a money bill for

(a) Indefinite Period (b) 6 month (c) 1 month (d) 14 days

Aptitude (Reasoning) (10)

Direction (41-42)

Friends Nitin, Reema, Jai, Deepti, Ashutosh are playing a game of corssing roads. In the beginning Nitin, Reema and Ashutosh are on the one side of the road and Deepti and Jai are on the other side. At the end of the game, it was found the Reema and Deepti are on the one side and Nitin, Jai and Ashutosh are on the other side of the road. Rules of the game are as follow:-

(i) One Movement means only one person crossing the road from any side to the other side.

(ii) No two person can cross the road simultaneously from any side to the other side.

(iii) Two person from the same side of the road can not move in consecutive "movements".

(iv) If one person crosses the road in a particular movement, he or she can not immediately move back to the other side.

(v) Jai and Reema did not take part in first 3 movements.

41. What is the minimum possible number of movements that took place in the entire game?

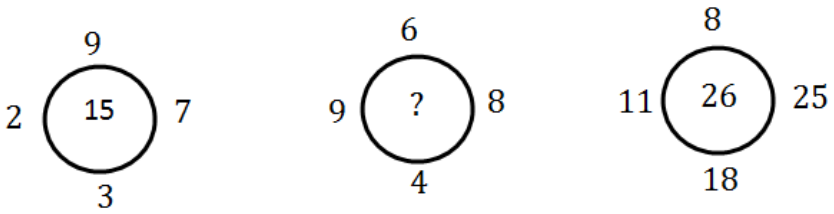
(a) 3 (b) 4 (c) 5 (d) 6

42. If number of movements are minimized in the game, then which of the following comnination of friends can never be together on one particular side of the road during the course of the game?

(a) Nitin, Reema, Deepti (b) Nitin, Jai, Deepti

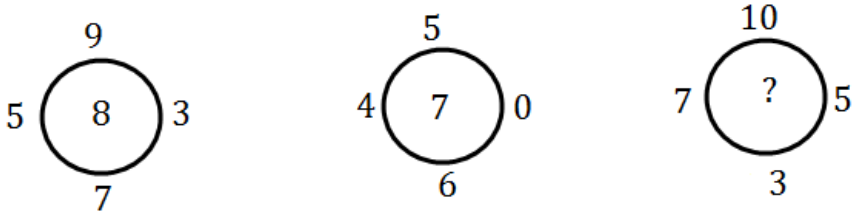
(c) Deepti, Jai, Ashutosh (d) Ashutosh, Nitin, Deepti

43.



(a) 72 (b) 18 (c) 9 (d) 19

44.



(a) 12 (b) 9 (c) 14 (d) 10

45. Which number will come in place of (Q)?

2	9	57	337		
3	(P)	(Q)	(R)	(S)	(T)

(a) 113 (b) 17 (c) 2912 (d) 8065

46. If the following words are arranged in logical order, then what will come in the first place in descending order?

(i) Pilot officer (ii) Air marshal (iii) Squadron Leader

(iv) Air Commodore (v) Wing Commander

(a) Squadron Leader (b) Wing Commander (c) Air Commodore (d) Air Marshal

Direction (47-48):

A, B, C, D, E, F and G are brothers. Two brothers had an argument and A said to B "you are as old as C was when I was twice as old as D, and will be as old as E Was when he was as old as C is now. B said to A, "you may be older than F but G is as old as I was when you where as old as G is and D will be as old as F was when F will be as old as G is.

47. Who is eldest brother?

(a) A (b) E (c) C (d) can't be determined

48. Who is the youngest brother?

(a) B (b) D (c) F (d) can't be determined

Direction (49-50):

Four sisters Suvarna, Tara, Uma and Vibha are playing a game such that the loser doubles the money of each of the other player. They played four games and each sister lost one game in alphabetical order. At the end of fourth game each sister had 32Rs.

49. Who started with the lowest amount?

(a) Suvarna (b) Tara (c) Uma (d) Vibha

50. Who started with the highest amount?

(a) Suvarna (b) Tara (c) Uma (d) Vibha

Science (20)

Physics (7)

51. Aditi, a student of class 9th has good understanding of Physics concepts. She generally use the concepts in real life activities or events. This makes her concepts more clear and also give confidence to her. One day she on seeing a lighting, starts counting seconds, until she hears thunder. She then claims to have found an approximate but simple rule that if count of second is divided by an integer, the result directly gives the distance of lighting source in km. What is the integer (approx). Take sound velocity as 330 m/s.

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

52. Ankit Kaushik, car winner of 1st RPS Olympiad, after winning the prize go for a trip with his family. During the trip he witnessed an incident. There was a basket of hot air balloon which consists of a man and some packets with total mass 'm'. On balloon there is an upward lift force which is constant but due to some defect it is less than the weight of basket as a result of which the balloon starts sinking down in air at an acceleration $\frac{g}{2}$. The man in the balloon was very disappointed due to this. Ankit Kaushik gave him an idea of dropping some packets from balloon. When man dropped some packets then balloon starts ascending with acceleration $\frac{g}{3}$. The man was very happy now and he thanked Ankit Kaushik for this. You need to find the total mass of packets to be dropped for this.

(a) $\frac{5}{9}$ m (b) $\frac{5}{8}$ m (c) $\frac{7}{9}$ m (d) $\frac{3}{8}$ m

53. Bhallu, a student of 9th class generally go the school by a train. Aallu, his friend go to the same school by a bicycle. The railway track runs parallel to the road until a turn brings the road to a railway crossing. Aallu rides his bicycle along the road everyday at constant speed of 20 km/hr. He normally meets the train that travels in the same direction at the crossing. One morning Aallu was completely involved in solving physics numerical problems so he got late by 25 minutes and met the train 10 km before the railway crossing. What will be speed of the train?

(a) 100 km/hr (b) 140 km/h (c) 160 km/h (d) 120 km/hr

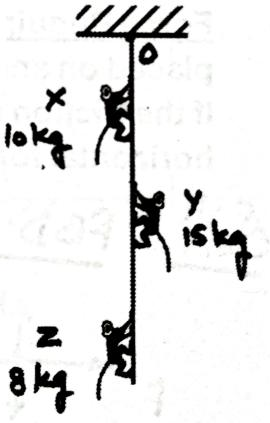
54. Figure shows three monkeys on a light rope attached to point O. Monkey X is descending at acceleration $2m/s^2$, Y is going up at a uniform speed 1 m/s and Z is climbing up at acceleration 1.5 m/s^2. Find tension in rope at point O. (Take $g = 10\ m/s^2$). Given that mass of $x = 10$ kg, $y = 15$ kg and $z = 8$ kg.

(a) 322 N

(b) 334 N

(c) 414 N

(d) 362 N



55. A binary star is a system of two stars that are gravitationally bound and are in orbit around their common center of gravity. Two indentical stars A & B, each of M, form a binary system. Radius of the orbit of star A is R. Assuming that dimensions of the stars are extremely small compared to their separation, what is the orbital speed of star B?

(a) $\sqrt{\frac{2GM}{R}}$ (b) $\sqrt{\frac{GM}{R}}$ (c) $\sqrt{\frac{GM}{4R}}$ (d) $\sqrt{\frac{GM}{2R}}$

56. A block of word weighs 12kg and has a relative density 0.6. It is to be dipped in the water with 0.9 of its volume immersed. What mass of metal is needed if some metal is attached below the wood? (Relative density of metal = 14)

(a) 4.30 kg (b) 6.46 kg (c) 5.72 kg (d0 7.24 kg

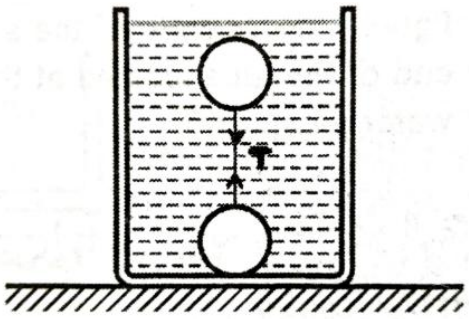
57. Two solid uniform spheres each of radius 5cm are connected by a light string and spheres are in tank of water (as shown in figure). If specific gravities of submerged spheres are 0.5 and 2, find tension in the string and the contact force between the bottom of the tank and the heavier sphere.

(a) 2.565 N, 2.565 N

(b) 2.565 N, 7.695 N

(c) 10.26 N, 2.565 N

(d) 7.695 N, 10.26 N



Chemistry (7)

58. A box of 1-litre capacity is divided into two equal compartments by a thin partition which is filled with 6g of H_2 and 16g CH_4 respectively. The pressure in each compartment is recorded as P atm. The total pressure when partition is removed will be:

(a) P (b) 2P (c) P/2 (d) P/4

59. The pair of ions having same electronic configuration is …….. .

(a) Cr^{3+}, Fe^{3+} (b) Fe^{3+}, Mn^{2+} (c) Fe^{3+}, Co^{3+} (d) Sc^{3+}, Cr^{3+}

60. 6.022×10^{20} molecules of urea are present in 100 mL of its solution. The concentration of urea solution is :

(a) 0.001 M (b) 0.01 M (c) 0.02 M (d) 0.1 M

61. The simplest formula of a compound containing 50% of an element X (Atomic weight 10) and 50% of element Y (Atomic weight 20) is :

(a) XY (b) X_2Y (c) XY_2 (d) X_2Y_3

62. The process which is responsible for the formation of Delta at a place where rivers meet the sea is?

(a) Colloid formation (b) Peptization (c) Emulsification (d) Coagulation

63. If 3.01×10^{20} molecules are removed from 98 mg of H_2SO_4, then number of moles of H_2SO_4 left are :

(a) 0.5×10^{-3}mol (b) 0.1×10^{-3}mol (c) 9.95×10^{-2}mol (d) 1.66×10^{-3}mol

64. In $_7N^{14}$ if mass attributed to electrons were doubled & the mass attributed to protons were halved, the atomic mass would become approximately :-

(a) Halved (b) Doubled (c) Reduced by 25% (d) Remain same

Biology (6)

65. Which two organelles are thought to have originated from free-living prokaryotic cells?

(a) Mitochondria and ribosomes (b) Chloroplast and nucleus

(c) Chloroplast and mitochondria (d) Lysosomes and mitochondria

66. Diphtheria is associated with the following organ

(a) blood (b) liver (c) pharynx (d) lungs

67. Pericycle in roots is responsible for

(a) formation of lateral roots (b) formation of vascular bundle for cortex

(c) formation of vascular bundle (d) providing mechanical support

68. The process of photosynthesis and respiration cause the cycling of _____ through the environment.

(a) Carbon (b) Water (c) Nitrogen (d) Hydrogen

69. Central sugarcane breeding research institute is situated at

(a) Darjeeling (b) Bhopal (c) Lucknow (d) Coimbatore

70. Which of the following structures is the functional unit in a Golgi complex?

(a) Thylakoid (b) Cisternae (c) Archoplasm (d) Cristae

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SUPER Achievements of **RPS GROUP OF SCHOOLS**

40 STUDENTS AIIMS 2021	66 STUDENTS NTSE-II 2022	507 STUDENTS NEET	441 STUDENTS IIT-JEE Main	80 STUDENTS IIT-JEE Advanced	15 STUDENTS KVPY	110 STUDENTS NDA	62 STUDENTS Securing 600 marks & Above in NEET	17 STUDENTS CLAT