

ALL INDIA RPS OLYMPIAD 2020

(Organized by RPS Education Society Mahendergarh)

M.M. 70

Class 9th

Time: 70 Mins.

English (10)

1. I shall resign _____ my post.
a) of b) from c) to d) No determiner
2. You have disgusted me. (Change into passive Voice)
a) You have been disgusted by me.
b) You had been disgusted by me.
c) I have been disgusted with you.
d) I have been disgusted by you.
3. "For good" means:
a) temporary b) for the benefit of c) to help someone d) forever
4. He said, "would that he were a king!" (Indirect speech will be)
a) He said that he would be a king.
b) He wished that he had been a king.
c) He wished would that he were a king.
d) He wished that he were a king.
5. It is already 09 :30 a.m. The teacher _____ be in his class.
a) shall b) must c) should d) can

Find the error part. (6 to 9)

6. (a) The Himalayas (b) lies to (c) the North of India. (d) No error.
7. (a) There is no (b) fear of the (c) train's coming late. (d) No error.
8. (a) such boys (b) as are guilty (c) will be punished. (d) No error.
9. (a) Neither you (b) came here (c) nor your brother did. (d) No error.
10. There was none but wept. The underlined part is –
a) main clause b) adjective clause c) noun clause d) adverb clause

Mathematics (20)

11. A number A4571203B is divisible by 18, then the value of A & B are respectively.
a) 2, 3 b) 8, 6 c) 4, 6 d) 6, 4
12. Let x and y be positive integers such that x is prime and y is composite. Then
a) $y - x$ cannot be an even integer b) xy cannot be an even integer
c) $\frac{x+y}{x}$ cannot be an even integer d) None of the above statements is true

13. If $a^2 = b + c$, $b^2 = c + a$, $c^2 = a + b$ then the value of $\frac{1}{1+a} + \frac{1}{1+b} + \frac{1}{1+c}$
- a) abc b) $a^2b^2c^2$ c) 1 d) 0
14. Typist A can type a sheet in 5 minutes, typist B in 6 minutes and typist C in 8 minutes. The average number of sheets typed per hour per typist is
- a) 9.831 b) 9.832 c) 9.833 d) 9.834
15. A car owner buys petrol at Rs. 75, Rs. 80 and Rs. 90 per litre for three successive years. What approximately is his average cost per litre of petrol if he spends Rs. 36000 each year?
- a) Rs. 81.666 b) Rs. 80.203 c) Rs. 81.201 d) Rs. 81.202
16. A regular hexagonal prism has perimeter of its base as 600cm and height equal to 200cm. How many litres of petrol can it hold?
- a) 5196 litre b) 5296 litre c) 5598 litre d) 5698 litre
17. A cuboidal block of $6\text{cm} \times 9\text{cm} \times 12\text{cm}$ is cut up in an exact number of equal cubes. The least possible number of cubes will be:
- a) 6 b) 9 c) 24 d) 30
18. The diagonal of the three faces of a cuboid are x, y, z respectively. What is the volume of the cuboid?
- a) $\frac{xyz}{2\sqrt{2}}$ b) $\frac{\sqrt{(x^2+y^2-z^2)(y^2+z^2-x^2)(z^2+x^2-y^2)}}{2\sqrt{2}}$
- c) $\frac{\sqrt{(y^2+z^2)(z^2+x^2)(x^2+y^2)}}{2\sqrt{2}}$ d) $\frac{\sqrt{x^2+y^2+z^2}}{2\sqrt{2}}$
19. If the distance from the vertex to the centroid of an equilateral triangle is 6cm, then what is the area of the triangle?
- a) 24cm^2 b) $27\sqrt{3}\text{cm}^2$ c) 12cm^2 d) $12\sqrt{3}\text{cm}^2$
20. ABC is an acute angled triangle. CD is the altitude through C. If $AB = 8\text{cm}$, $CD = 6\text{cm}$, find the distance between the mid-points of AD and BC
- a) 3cm b) 4cm c) 5cm d) 6cm
21. Let x is the area of the right angled triangle and b is one of the sides containing the right angle, then what is the length of the altitude on the hypotenuse?
- a) $\frac{2xb}{\sqrt{b^4+4x^2}}$ b) $\frac{2x^2b}{\sqrt{b^4+4x^2}}$ c) $\frac{2xb^2}{\sqrt{b^4+4x^2}}$ d) $\frac{2x^2b^2}{\sqrt{b^4+4x^2}}$
22. In-centre of a triangle lies in the interior of
- a) An isosceles triangle only b) Any triangle
- c) An equilateral triangle only d) A right triangle only

23. The area of a square and circle is same and the perimeter of square and equilateral triangle is same, then the ratio between the area of circle and area of equilateral triangle is:
a) $\pi : 3$ b) $9 : 4\sqrt{3}$ c) $4\sqrt{3} : 3$ d) None of these
24. The system of plotting of points on the plane is initiated by a French Mathematician
a) P.Laplace b) Blaise Pascal c) J.Cardon d) Rene Descartes
25. In a quadrilateral $ABCD$, $\angle B = 90^\circ$ and $AD^2 = AB^2 + BC^2 + CD^2$. Then $\angle ACD$ is equal to:
a) 30° b) 45° c) 60° d) None of these
26. In a cyclic quadrilateral PQRS, $\angle P$ is double its opposite angle and difference between the other two angles is one-third of $\angle P$. The minimum difference between any two angles of this quadrilateral is
a) 30° b) 40° c) 10° d) 20°
27. When $x^{40} + 2$ is divided by $x^4 + 1$, what is the remainder?
a) 0 b) 1 c) 2 d) 3
28. The number of diagonals of a regular polygon is 27. Then each of the interior angles of the polygon is
a) $\left(\frac{500}{3}\right)^\circ$ b) 128° c) 140° d) 154°
29. In $\triangle ABC$, $AC = BC$, S is the circumcentre and $\angle ASB = 150^\circ$, find $\angle CAB$.
a) $55\frac{1}{2}^\circ$ b) $52\frac{1}{2}^\circ$ c) $62\frac{1}{2}^\circ$ d) $35\frac{1}{2}^\circ$
30. The sides of a triangle are 2006 cm, 6002 cm and m cm, where m is a positive integer. Find the number of such possible triangles
a) 1 b) 2006 c) 3996 d) 4011

Social Science (10)

31. Which constitutional amendment deals with the Right to Education?
a) 61st b) 86th c) 92nd d) 73rd
32. When was the first Backward Classes Commission set up?
a) 1953 b) 1961 c) 1970 d) 1979
33. Which article of Indian Constitution ensures to the citizens of India the six fundamental freedoms?
a) 22 b) 21 c) 20 d) 19
34. Which one is not an example of non-market activities?
a) Nursing of the baby by the mother. b) Playing football for health.
c) Singing for self-entertainment. d) Hiring an electrician for electrical fault.

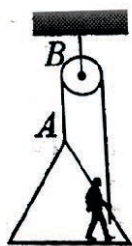
35. When was Targeted Public Distribution System (TPDS) adopted in India?
 a) 1992 b) 1995 c) 1997 d) 2000
36. What was the name of the assembly which was called in France in 1792?
 a) Estates General b) Convention c) National Assembly d) Directory
37. What was the other name of the commune of farmers in Russia?
 a) Mir b) Conservatism c) Capitalist d) Jadddhists
38. Which one is an example of man-made lake?
 a) Hirakund b) Wular c) Pulicat d) Barapani
39. The phenomenon of the monsoon is experienced in which range of latitudes?
 a) $10^{\circ}N$ to $10^{\circ}S$ b) $15^{\circ}N$ to $15^{\circ}S$
 c) $20^{\circ}N$ to $20^{\circ}S$ d) $25^{\circ}N$ to $25^{\circ}S$
40. In which state is lying Mahananda Wildlife Sanctuary?
 a) Assam b) West Bengal c) Kerala d) Odisha

Science-20 (PCB-7+7+6)

41. A man in a lift ascending with an upward acceleration ' a ' throws a ball vertically upwards with a velocity ' v ' with respect to himself and catches it after ' t_1 ' seconds. Afterwards when the lift is descending with the same acceleration ' a ' acting downwards the man again throws the ball vertically upwards with the same velocity with respect to him and catches it after ' t_2 ' seconds?
- i) the acceleration of the ball w.r.t. ground is g when it is in air
 ii) the velocity v of the ball relative to the lift is $\frac{g(t_1+t_2)}{t_1 t_2}$
 iii) the acceleration ' a ' of the lift is $\frac{g(t_2-t_1)}{t_1+t_2}$
 iv) the velocity ' v ' of the ball relative to the man is $\frac{g t_1 t_2}{(t_1+t_2)}$

Which of the following options is correct?

- a) i, iv b) i, iii, iv c) ii, iii, iv d) ii, iii
42. To paint the side of a building, painter normally hoists himself up by pulling on the rope A as in figure. The painter and platform together weigh 200 N. The rope B can withstand 300 N. Then

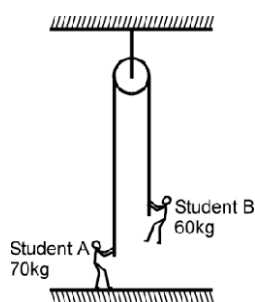


- i) The maximum acceleration that painter can have upwards is 5 m/s^2 .
 ii) To hoist himself up, rope B must withstand minimum 400 N force.
 iii) Rope A will have a tension of 100 N when the painter is at rest.
 iv) The painter must exert a force of 200 N on the rope A to go downwards slowly.

Which of the following options is correct?

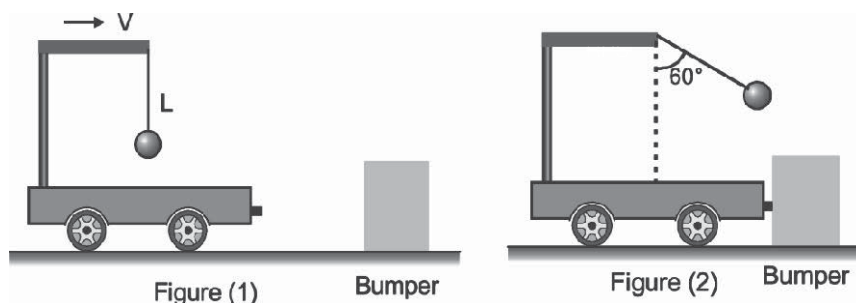
- a) i, iii b) i, ii c) ii, iv d) i, ii, iii

43. A rope of negligible mass passes over a pulley of negligible mass attached to the ceiling, as shown in figure. One end of the rope is held by Student A of mass 70 kg, who is at rest on the floor. The opposite end of the rope is held by Student B of mass 60 kg, who is suspended at rest above the floor. The minimum acceleration a_0 with which the Student B should climb up the rope to lift the Student A upward off the floor.



- a) $\frac{1}{3} \text{ m/s}^2$ b) $\frac{2}{3} \text{ m/s}^2$ c) $\frac{4}{3} \text{ m/s}^2$ d) $\frac{5}{3} \text{ m/s}^2$

44. A ball is suspended from the top of a cart by a string of length 1.0 m. The cart and the ball are initially moving to the right at constant speed V , as shown in figure I. The cart comes to rest after colliding and sticking to a fixed bumper, as in figure II. The suspended ball swings through a maximum angle 60° . The initial speed V is (take $g = 10 \text{ m/s}^2$)



- a) $\sqrt{10} \text{ m/s}$ b) $2\sqrt{5} \text{ m/s}$ c) $5\sqrt{2} \text{ m/s}$ d) 4 m/s

45. The thickness of the ice layer on the surface of lake is 20 m. A hole is made in the ice layer. What is the minimum length of the rope required to take a bucket full of water out? Take density of ice $= 0.9 \times 10^3 \text{ kg/m}^3$.

- a) 20 m b) 5 m c) 2 m d) 18 m

46. What is the minimum energy required to launch a satellite of mass m from the surface of a planet of mass M and radius R in a circular orbit at an altitude of $2R$?

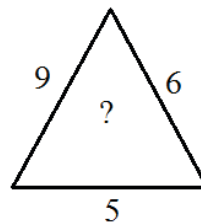
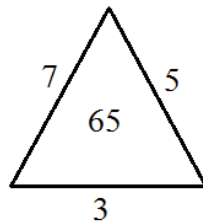
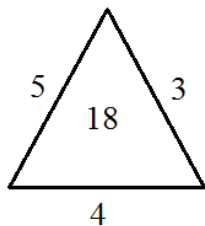
- a) $\frac{5GmM}{6R}$ b) $\frac{2GmM}{3R}$ c) $\frac{GmM}{2R}$ d) $\frac{GmM}{3R}$

47. A thin uniform cylindrical shell, closed at both ends, is partially filled with water. It is floating vertically in water in half-submerged state. If ρ_c is the relative density of the material of the shell with respect to water, then the correct statement is that the shell is
a) more than half-filled if ρ_c is more than 1.0. b) half-filled if ρ_c is more than 0.5.
c) less than half-filled if ρ_c is than 0.5. d) more than half-filled if ρ_c is less than 0.5.
48. Vapour density of a metal chloride is 66 its oxide contains 53% metal. The atomic mass of the metal is:
a) 21 b) 27.06 c) 54 d) 2.706
49. When a metal is burnt its mass is increased by 24%. The equivalent mass of the metal will be:
a) 25 b) 24 c) 33.3 d) 76
50. The number of electrons in an atom with atomic number 105 having $(n + l) = 8$ are:
a) 30 b) 15 c) 25 d) 17
51. The number of vacant d-orbitals in completely excited Cl atom is:
a) 2 b) 3 c) 1 d) 4
52. If 20% nitrogen is present in a compound its minimum molecular weight will be:
a) 144 b) 28 c) 100 d) 70
53. A gas is found to have the formula $(CO)_x$. Its vapour density is 70. The value of x must be:
a) 7 b) 5 c) 4 d) 6
54. The quantum numbers for the last electron in an atom are $n = 3, l = 1$ and $m = -1$. The atom is:
a) Si b) Al c) Mg d) C
55. Flagella of prokaryotic and eukaryotic cells differ in –
a) Location in cell and mode of functioning
b) Microtubular organization and type of movement
c) Microtubular organization and function
d) Type of movement and placement in cell
56. In 1984, the Bhopal gas tragedy took place because methyl isocyanate:-
a) Reacted with ammonia b) Reacted with CO_2
c) Reacted with water d) Reacted with DDT
57. Mast cells of connective tissue contains:-
a) Heparin and histamine b) Heparin and calcitonin
c) Serotonin and melanin d) Vasopressin and relaxin
58. In Hydra, waste material of food digestion and nitrogenous waste material removed from
a) Mouth and mouth b) Body wall and body wall
c) Mouth and body wall d) Mouth and tentacles
59. HIV that cause AIDS, first start destroying
a) B – Lymphocyte b) Leucocyte
c) Thrombocyte d) Helper T – Lymphocyte

60. Kranti, pusa agarni and pusa bold are improved varieties of
 a) Urad bean b) Mustard c) Sunflower d) Chick pea

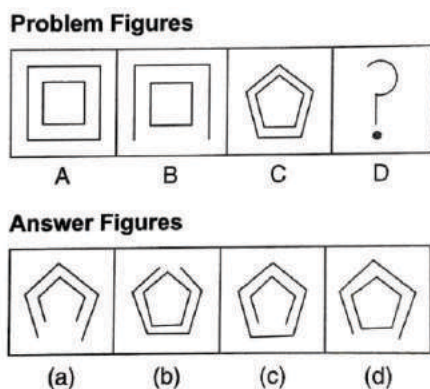
Aptitude (10)

61. Find the next term in the given number series.
 111, 114, 120, 123, 129 _____
 a) 135 b) 138 c) 139 d) 141
62. If E = 5 and HOTEL = 12, how will you code LAMB?
 a) 7 b) 10 c) 26 d) 28
63. In the following questions there is a relationship between the two words given to the left of the sign (: :) of which one is missing. Find the missing one from the given alternatives?
 Parliament : Great Britain : : Congress : _____
 a) Canada b) Japan c) United States of America d) South Korea
64. Deepa moved a distance of 75 meters towards the north. She then turned to the left and walking for about 25 metres, turned left again and walked 80 metres finally, she turned to the right at an angle of 45° . In which direction was she moving finally?
 a) North-East b) North-West c) South-East d) South-West
65. A family went for a vacation. Unfortunately, it rained daily for 13 days when they were there. But whenever it rained in the morning, they had clear afternoons and vice versa. In all, they enjoyed 11 mornings and 12 afternoons. How many days in all did they stay there?
 a) 15 b) 18 c) 20 d) 25
66. Find the missing term in the given figures.

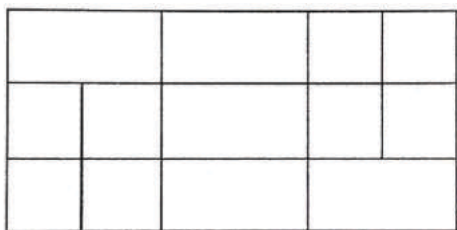


- a) 112 b) 92 c) 82 d) 102
67. David gets on the elevator at the 11th floor of a building and rides up at the rate of 57 floor per minute. At the same time, Albert gets on an elevator at the 51st floor of the same building and rides down at the rates of 63 floor per minute. If they continue travelling at these rates, then at which floor will their path cross?
 a) 19 b) 28 c) 30 d) 37
68. Neelam, who is Rohit's daughter, says to Indu, "Your mother Reeta is the younger sister of my father, who is the third child of Sohan Ji". How is Sohan Ji related to Indu?
 a) Maternal-Uncle b) Father c) Grandfather d) Father-in-law

69. Each of the following questions consists of two sets of figure. Figure A, B, C and D constitute the Problem Set while Figs. (a), (b), (c) and (d) constitute the Answer Set. There is a definite relationship between Figs. A and B. Establish a similar relationship between Figs. C and D by choosing a suitable Fig. D from the Answer Set.



70. How many squares are there in the following figure?



- a) 10 b) 12 c) 14 d) 16