

ALL INDIA **RPS** 2021 OLYMPIAD

Organized by : -
RPS Education Society
Mahendergarh,
Haryana

2nd mega All India Online & Offline Event

Where the Brilliants can also have chance to get bigger platform in 2021



SANTRO CAR



SCOOTY



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TABLETS



KINDLES



BICYCLES



EDUCATIONAL KIT

EXAMINATION (PHASE-I)

RPS Olympiad-2021

Class-10th

M.M. : 70**Time : 70 Mins.****English (10 Marks)**

1. "Far – and away" means
- a) To be away
 - b) To escape
 - c) High price
 - d) Certainly

Find the error part (if possible) in question no. 2, 3, 4.

2. (a) The weather here is always warm and (b) this is the reason because (c) people are inside.
(d) No error.
3. (a) 'Meatless Days' have been (b) made (c) into a film. (d) No error.
4. (a) Don't talk to her, she always (b) remains in a temper (c) these days. (d) No error.

Identify the wrong sentence :

5. a) Forty five students went to the Church yesterday to see the stained glass there.
b) Recently I have visited Jamashedpur and found the scenery to be marvellous.
c) They wished for the bride and the bridegroom that their married life might be successful.
d) More pens than one was bought.

Choose the correct sentence :

6. a) No sooner had I asked for the money than my brother agreed.
b) No sooner I had ask for the money than my brother agreed.
c) No sooner I had asked for the money then my brother agreed.
d) No sooner I had asked for the money than my brother was agree.
7. He said, "Hello ! where are you going?" (**Indirect speech will be**)
- a) He told Hello and asked where are you going.
 - b) He said Hello where he was going.
 - c) He greeted me and asked where he was going?
 - d) He greeted me and asked where I was going.
8. If he beat you, what _____ you do?
- a) need
 - b) should
 - c) may

- d) would
9. He complied _____ my request.
- a) with
b) by
c) of
d) through
10. A broken soul can bring the biggest change in the world. **The underlined part is a/an –**
- a) Verb b) Adjective c) Pronoun d) Noun

Mathematics (20 Marks)

11. The number of common terms to the two sequences 17, 21, 25,, 417 and 16, 21, 26,, 466 is :
- a) 19
b) 20
c) 21
d) 84
12. Points A and B are 90 km apart from each other on a highway. A car starts from A and another from B at the same time. If they go in the same direction they meet in 9 hours and if they go in opposite directions, they meet in $9/7$ hours. Find their speed (in km/h).
- a) 25, 45
b) 20, 50
c) 30, 40
d) 35, 65
13. $\sin^6 A + \cos^6 A$ is equal to
- a) $1 - 3\sin^2 A \cos^2 A$
b) $1 - 3\sin A \cos A$
c) $1 + 3\sin^2 A \cos^2 A$
d) 1
14. The radius of a circle is 20 cm. The radii (in cm) of three concentric circles drawn in such a manner that the whole area is divided into four equal parts, are :
- a) $20\sqrt{2}, 20\sqrt{3}, 20$

b) $\frac{10\sqrt{3}}{3}, \frac{10\sqrt{2}}{3}, \frac{10}{3}$

c) $10\sqrt{3}, 10\sqrt{2}, 10$

d) 17, 14, 9

15. If $(x + k)$ is a common factor of $(x^2 + px + q)$ and $(x^2 + lx + m)$, then the value of k is

a) $l + p$

b) $m - q$

c) $\frac{l-p}{m-q}$

d) $\frac{m-q}{l-p}$

16. Let $f(x)$ be a quadratic polynomial with $f(2) = 10$ and $f(-2) = -2$. Then the coefficient of x in $f(x)$ is

a) 1

b) 2

c) 3

d) 4

17. The sides of a triangle are distinct positive integers in an arithmetic progression. If the smallest side is 10, the number of such triangles is

a) 8

b) 9

c) 10

d) infinitely many

18. If a, b, c, d are positive real numbers such that

$$\frac{a}{3} = \frac{a+b}{4} = \frac{a+b+c}{5} = \frac{a+b+c+d}{6}, \text{ then } \frac{a}{b+2c+3d} \text{ is}$$

a) $\frac{1}{2}$

b) 1

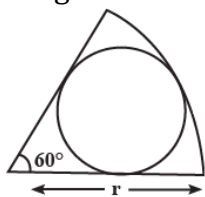
c) 2

d) not determinable

19. A circle is drawn in a sector of a larger circle of radius r , as shown in the adjacent figure. The smaller circle is tangent to the two bounding radii and the arc of the sector. The radius of the small circle is

a) $\frac{r}{2}$

b) $\frac{r}{3}$



c) $\frac{2\sqrt{3r}}{5}$

d) $\frac{r}{\sqrt{2}}$

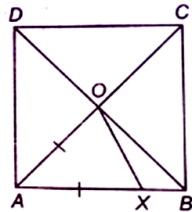
20. A tank 4 m long and 2.5 m wide and 6 m deep is dug in a field 10 m long and 9 m wide. If the earth dugout is evenly spread over the field, the rise in level of the field will be :
- a) 80 cm
b) 75 cm
c) 60 cm
d) 30 cm
21. If three positive real numbers a, b, c are in A.P. such that $a.b.c. = 4$, then the minimum value of b is :
- a) $2^{1/2}$
b) $2^{1/3}$
c) $2^{2/3}$
d) $2^{3/2}$
22. If $2x^2 - 7xy + 3y^2 = 0$, then the value of $x : y$ is
- a) 3 : 2
b) 2 : 3
c) 3 : 1 and 1 : 2
d) 5 : 6
23. If α, β, γ are the roots of the equation $x^3 + 4x + 1 = 0$, then $(\alpha + \beta)^{-1} + (\beta + \gamma)^{-1} + (\gamma + \alpha)^{-1}$ is equal to
- a) 2
b) 3
c) 4
d) 5
24. If $a + b + c = 0$, then what is the value of $\frac{a^2 + b^2 + c^2}{(a - b)^2 + (b - c)^2 + (c - a)^2}$
- a) 1
b) 3
c) $\frac{1}{3}$
d) 0

25. Let $f_k(x) = \frac{1}{k} (\sin^k x + \cos^k x)$ where $x \in R$ and $k \geq 1$. Then $f_4(x) - f_6(x)$ equal
- a) $\frac{1}{6}$
 - b) $\frac{1}{3}$
 - c) $\frac{1}{4}$
 - d) $\frac{1}{12}$

26. If $x^2 - 5x + 1 = 0$, then $\frac{x^{10} + 1}{x^5} =$
- a) 2424
 - b) 3232
 - c) 2525
 - d) 2323

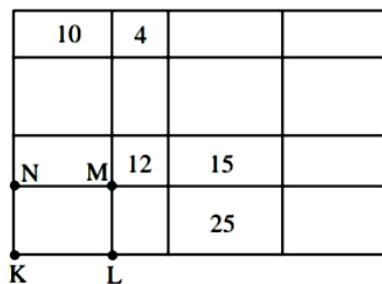
27. In the given figure, ABCD is a square in which $AO = AX$. What is $\angle XOB$?

- a) 22.5°
- b) 25°
- c) 30°
- d) 45°



28. A pot contains 81 litres of pure milk. $\frac{1}{3}$ of the milk is replaced by the same amount of water. Again $\frac{1}{3}$ of the mixture is replaced by that amount of water. What is the ratio of milk and water in the new mixture?
- a) 1 : 2
 - b) 2 : 5
 - c) 3 : 7
 - d) 4 : 5
29. A rectangle is divided into 16 sub-rectangles as in the figure, the number in each sub rectangle represents the area of that sub-rectangle. What is the area of the rectangle KLMN?

- a) 20
- b) 30
- c) 40
- d) 50



30. Let α and β be the roots of $x^2 - 6x - 2 = 0$ with $\alpha > \beta$. If $a_n = \alpha^n - \beta^n$ for $n \geq 1$ then the value of $\frac{a_{10} - 2a_8}{2a_9}$
- a) 1
 - b) 2
 - c) 3
 - d) 4

Social Science (10 Marks)

31. 'Hetairia Philike' (association of friends) was founded by the
- a) Germans
 - b) Greeks
 - c) Austrians
 - d) Italians
32. Who formed a society of 'Khudai Khidmatgars' or Servants of God?
- a) Khan Abdul Ghaffar Khan
 - b) Maulana Shaukat Ali
 - c) Maulana Mohammad Ali
 - d) Hasrat Mohani
33. The soil typical in areas of high temperature and high rainfall is
- a) alluvial soil
 - b) red soil
 - c) laterite soil
 - d) black soil
34. Which one of the following pairs of statements are incorrect?
- i) Bauxite is an ore of aluminium.
 - ii) Minerals are renewable.
 - iii) Mica is a non-metallic mineral.
 - iv) Khetri mines is famous for manganese.
- a) i and iv
 - b) ii and iv
 - c) iii and iv
 - d) i and iii
35. Which one of the following Iron and Steel plant is set up with German collaboration?
- a) Bhilai

- b) Rourkela
c) Durgapur
d) Bokaro
36. Sustainable development may be defined as development that meets the needs of the present generation
- a) without taking into account the needs of the future generations.
b) without compromising the ability of the future generations to meet their own needs.
c) and does not care for the needs of future generations.
d) none of the above
37. The problem of double coincidence of wants
- a) cannot be solved with the use of money.
b) can be solved with the use of commodity.
c) can be solved with the use of money.
d) cannot be solved at all.
38. How many languages are recognised as scheduled languages besides Hindi?
- a) 22
b) 21
c) 23
d) 24
39. Which state is having coalition Govt. at present?
- a) Haryana
b) Odisha
c) West Bengal
d) Uttar Pradesh
40. How many National Political Parties are there in India at Present?
- a) 6
b) 7
c) 8
d) 9

Science (20 Marks)

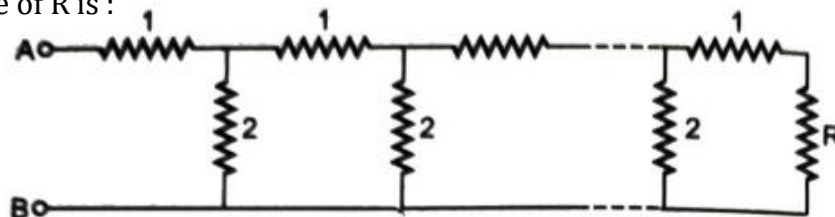
41. It is quite interesting that a concave mirror can form magnified image of an object. A student has a pencil of length equal to one third of the focal length of the concave mirror. She placed the pencil along the principal axis of the concave mirror such that its real and elongated image just touches the pencil itself. The magnitude of magnification in this situation is equal to
- $\frac{5}{4}$
 - $\frac{2}{3}$
 - $\frac{3}{2}$
 - $\frac{4}{3}$

42. Gullu bought a brand new heater which begins to boil in 15 mins after being switched on. One day he decided to make some changes in the length of heating element so that the heater now begins to boil in 10 mins when connected to same supply. The ratio of original length of heating wire to that of the new length will be :

- $\frac{3}{2}$
- $\frac{2}{3}$
- $\frac{9}{4}$
- $\frac{4}{9}$

43. An electrical engineer designed a circuit as given in the figure such that the net resistance between A and B does not depend on the number cells connected between A and B. In this situation, the value of R is :

- 4 Ω
- 3 Ω
- 2 Ω
- 1 Ω

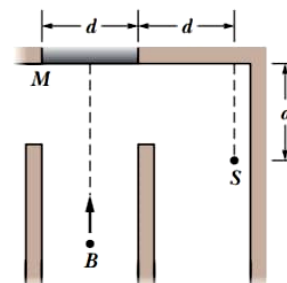


44. By Oersted's experiment, magnetic effect of electric current was detected. Let you are having vertical wire carrying direct current in vertically upward direction. Let us consider two points A and B lie respectively to the east and west of the conductor at same distance from it then :
- Net magnetic field at A is less than that at B
 - Net magnetic field at B is less than that at A
 - Net magnetic field at A is equal to that at B

d) Net magnetic field at A will be half as that of B

45. Security camera is used for the security reasons now a days but in past time some different techniques were used. Gautam is standing at point B (at the middle of gallery) and his mother is working in kitchen at S. Now Gautam starts moving in gallery whose overhead view is shown in figure. It has plane mirror M mounted at one end. How far from the mirror will Gautam be when his mother can first see him in the mirror. ($d = 3\text{m}$).

- a) 3 m
b) 4.5 m
c) 1.5 m
d) 6 m

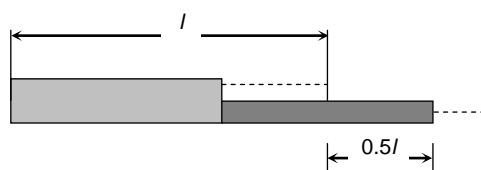


46. A uniform wire of copper of length 'l' is shaped into a circle of radius r. If O is the centre of the circle & A and B are the points on the circumference of circle such that angle $AOB = \phi$. Now a ideal cell is connected between points A and B. Considering that the arc AB which has angle ϕ is smaller, the ratio of magnetic field at the centre due to both the arcs (smaller to larger) is :

- a) $\phi : (2\pi - \phi)$
b) $\phi^2 : (2\pi - \phi)^2$
c) $\phi : 2\pi$
d) 1 : 1

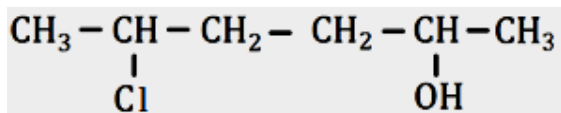
47. Resistance of a wire depends upon the length as well as area of its cross section. We are having a uniform wire of length 'l'. In order to quadruple the resistance of a uniform wire, a part of its length was uniformly stretched till the final length of the entire wire was 1.5 times the original length, the part of the wire was fraction equal to

- a) 1 / 6
b) 1 / 8
c) 1 / 10
d) 1 / 4



48. Caustic soda is -
a) Effluorescent
b) Deliquescent
c) Oxidant
d) Reductant

49. Give IUPAC name of the compound given below -

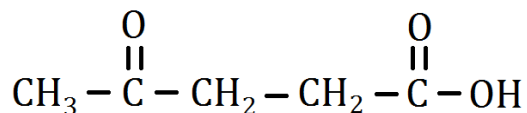


- a) 2 - Chloro - 5 -Hydroxyhexane
- b) 2 - Hydroxy - 5 - Chlorohexane
- c) 5 - Chlorohexan - 2 - ol
- d) 2 - Chlorohexan - 5 - ol

50. The element with atomic number 113 has recently been discovered. Its electronic configuration is similar to that of -

- a) Ge
- b) Al
- c) Li
- d) Br

51. The IUPAC name of the compound shown below is -



- a) 1 - Hydroxypentane - 1, 4 - dione
- b) 1, 4 - dioxopentanol.
- c) 1 - 4 carboxybutan - 3 - one.
- d) 4 - oxopentanoic acid

52. Lead is present in which of the following ores -

- a) Limestone
- b) Cerussite
- c) Siderite
- d) Dolomite

53. The oxidation number of Fe in $\text{K}_4\text{Fe}(\text{CN})_6$ is :

- a) + 6
- b) + 4
- c) + 3
- d) +2

54. Which of the following is not a redox change?
- $2\text{H}_2\text{S} + \text{SO}_2 \rightarrow 2\text{H}_2\text{O} + 3\text{S}$
 - $2\text{BaO} + \text{O}_2 \rightarrow 2\text{BaO}_2$
 - $\text{BaO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + \text{H}_2\text{O}_2$
 - $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
55. The minerals involved in the photolysis of water are
- Manganese
 - Calcium
 - Magnesium
 - Chloride
- i and ii only
 - i, ii and iv only
 - i, ii and iii only
 - iii and iv only
56. The sequence of conduction in human heart may be
- SA-node, bundle of His, Purkinje fibres, AV-node, heart muscle
 - SA-node, AV-node, Purkinje fibres, bundle of His, heart muscle
 - SA-node, AV-node, bundle of His, Purkinje fibres, heart muscle
 - none of these
57. Sertoli cells are found in
- ovaries and secrete progesterone
 - adrenal cortex and secrete adrenaline
 - seminiferous tubules and provide nutrition to germ cells
 - pancreas and secrete cholecystokinin
58. A normal-visioned man whose father was colour-blind, marries a woman whose father was also colour-blind. They have their first child as a daughter. What are the chances that this child would be colour-blind?
- 100 %
 - zero percent
 - 25 %
 - 50 %
59. Inverted pyramid is found in
- biomass pyramid of aquatic system
 - energy pyramid of grassland
 - biomass pyramid of grassland
 - pyramid of number of aquatic system

60. Which of the following regions of the brain is incorrectly paired with its function?
- a) Corpus callosum – communication between the left and right cerebral cortices
 - b) Cerebrum – calculation and contemplation
 - c) Medulla oblongata – involuntary control
 - d) Cerebellum – language comprehension

Aptitude (10 Marks)

Directions (Q. 61 to Q. 62) : Study the following information and answer the question that follow.

Six friends-Dheeraj, Vicky, Amit, Nasir, Rajeev and Sushma are studying six different subjects which are –

Mathematics, Chemistry, Social studies, Mental ability, English and Hindi not necessarily in the same order.

Each one likes a different sports- hockey, cricket, swimming, football, badminton and tennis, again not in the same order. Nasir is not studying Hindi. Rajeev is studying Social studies and likes hockey. Amit likes swimming and is not studying Hindi. The one who likes football is studying English. Sushma is studying Mental ability and does not like tennis. The one who likes badminton is studying Chemistry. Dheeraj and Vicky do not like badminton. Dheeraj does not like tennis.

61. Which subject is Dheeraj Studying?
- a) Hindi
 - b) English
 - c) Chemistry
 - d) Mathematics
62. Which sport does Vicky like?
- a) Badminton
 - b) Football
 - c) Cricket
 - d) Tennis

Directions (Q. 63 to Q. 64): There are 10 family members A, B, C, D, E, F, G, H, I and J. A has 3 sons and 3 grand children. Out of three sons, C and D are married. Both had a dispute and they started living separately in H. No.-11 and H. No.-12. On the occasion of Rakhi, I, the uncle of F, told her to tie a Rakhi to her cousins. So she went to D's sister in law's house and E opened the gate. There are 3 male

members in H. No.-11 and 2 female members in H. No.-12. Both the grandsons of B were happy to have a Rakhi. H told G and other brother to give some present to their sister.

63. Who are the three grandchildren?
- G, E, J
 - G, E, F
 - G, F, I
 - H, J, G
64. Which of the following can never be a couple?
- H and C
 - D and J
 - E and I
 - A and B
65. Fresh berries contain 60% water while dry berries contain 25% water. What is the weight of dry berries obtained from 40 kg fresh berries?
- $\frac{62}{5}$ kg
 - $\frac{64}{3}$ kg
 - $\frac{74}{3}$ kg
 - $\frac{79}{5}$ kg
66. In a certain coding language if TRIANGLE is coded as ELTUA IEM, then what will be the code for PENTAGON?
- QJLJXQEJ
 - XQJLQGEZ
 - XQGQJLEZ
 - QJXQXLEZ
67. The minute hand of a clock overtakes the hour hand at intervals of 76 minute of the correct time. How much does a clock gain or lose in a day?
- lose $198 \frac{169}{209}$ minute
 - gain $198 \frac{169}{209}$ minute
 - lose $199 \frac{169}{209}$ minute
 - gain $199 \frac{169}{209}$ minute

68. If the national day of a country was celebrated on the 4th Saturday of a month, then find the date of celebration, when the first day of that month is Tuesday?
- a) 24th
 - b) 25th
 - c) 26th
 - d) 27th
69. Find the next term in the series.
23, 31, 47, 79, 143, ?
- a) 265
 - b) 286
 - c) 281
 - d) 271
70. How is Tanya related to the man in the photograph?
- I. Man in the photograph is the only son of Tanya's grandmothers.
 - II. The man in the photograph has no brothers or sisters and his father is Tanya's grandfather.
- a) I alone is sufficient
 - b) II alone is sufficient
 - c) Neither I nor II sufficient
 - d) Both together are sufficient