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**OLYMPIAD 2022**  
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PHASE-I SUNDAY  
**13** FEBRUARY  
8:00 A.M. onwards (Online)  
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**FRIDAY,**  
**FEBRUARY 11, 2022**

SPORTS KIT

# RPSOLYMPIAD-2022

# CLASS-10<sup>th</sup>

M.M. 70

Class -10th  
English (10)

Time: 70 minutes

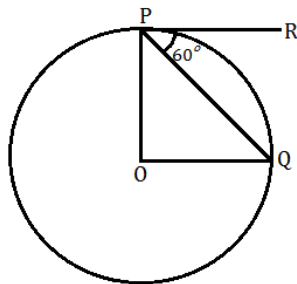
1. He said, "O that I were a bird !" (Change into indirect speech)  
(a) He wished that he were a bird.  
(b) He wished that I were a bird.  
(c) He said that he had been a bird.  
(d) He wished O that he had been a bird.
2. I prevailed ..... him to make an attempt at the competitive test. (Fill the gap by choosing correct option)  
(a) to                      (b) of                      (c) on                      (d) for
3. He is not a beggar that he'll ask for dowry. (Identify the underlined clause)  
(a) Principal clause              (b) Adjective clause  
(c) Noun clause              (d) Adverb clause
4. Find an incorrect sentence out of them.  
(a) He is used to lying.              (b) He need not to go.  
(c) He is likely to be arrested.              (d) He dare not ask.
5. Read between the lines means .....  
(a) to read all the lines  
(b) to read repeatedly  
(c) to detect the real or hidden meaning  
(d) to read quickly
6. If you ..... see her, give her my regards.  
(a) should              (b) will              (c) must              (d) would
7. Help ! I ..... . (Complete the sentence by choosing the most appropriate option)  
(a) will fall              (b) will be falling              (c) will have fallen              (d) am going to fall
8. Seeing the tired man fall in the waiting room, I tried to reach him to give support.  
Read the above sentence carefully and identify the wrong match of the underlined non-finite verbs out of the given options.  
(a) Seeing - gerund  
(b) waiting - gerund  
(c) tired - participle  
(d) fall - infinitive

9. Whom did you laugh at ? (Change into passive voice)  
 (a) By whom was laughed by you?  
 (b) Whom was laughed at by you?  
 (c) Who was laughed at by you?  
 (d) Who was laughed by you?
10. Such a girl ..... I know is at the party.  
 (a) so (b) as (c) that (d) if

**Mathematics (20)**

11. If  $m^2 - 1$  is divisible by 8, if m is  
 (a) An even integer (b) An odd integer  
 (c) A natural number (d) A whole number
12. The largest number which divides 60 and 75, leaving remainders 8 and 10 are respectively.  
 (a) 260 (b) 75 (c) 65 (d) 13
13. The value of k, for which the system of equations  $x + (k + 1)y = 5$  and  $(k + 1)x + 9y = 8k - 1$  has infinity many solutions is  
 (a) 2 (b) 3 (c) 4 (d) 5
14. The  $(n - 1)^{\text{th}}$  term of an A.P 7, 12, 17, 22 ... is given by.  
 (a)  $5n + 2$  (b)  $5n + 3$  (c)  $5n - 5$  (d)  $5n - 3$
15. If the numbers a, b, c, d, e are in A.P then the value of  $a - 4b + 6c - 4d + e$  is  
 (a) 0 (b) 1 (c) - 1 (d) 2
16. The points (1, 1), (-2, 7) and (3, -3) are  
 (a) Vertices of an equilateral triangle (b) Collinear  
 (c) Vertices of an isosceles triangle (d) None of these
17. If  $\sec A + \tan A = x$ , then  $\cos A =$   
 (a)  $\frac{x}{x^2-1}$  (b)  $\frac{2x}{x^2-1}$  (c)  $\frac{x}{x^2+1}$  (d)  $\frac{2x}{x^2+1}$
18.  $\sin(45^\circ + \theta) - \cos(45^\circ - \theta)$  is equal to  
 (a)  $2 \cos\theta$  (b) 0 (c)  $2 \sin\theta$  (d) 1
19. The value of  $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ \dots + \sin^2 90^\circ$  is equal to  
 (a) 8 (b) 8.5 (c) 9 (d) 9.5
20. If a tower 30m high casts a shadow  $10\sqrt{3}m$  long on the ground, then what is angle of elevation of the Sun  
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d) None of these
21. The diameter of a wheel is 1.26m. The distance travelled in 500 revolutions is  
 (a) 2670 m (b) 2880 m (c) 1980 m (d) 1596 m

22. If  $\alpha, \beta$  are the zero's of the polynomial  $f(x) = x^2 - 3x - 2$ , find a quadratic polynomial whose zero's are  $\frac{1}{2\alpha+\beta}, \frac{1}{2\beta+\alpha}$
- (a)  $k(16x^2 - 9x + 1)$  (b)  $k(x^2 - 9x + 16)$   
 (c)  $k\left(x^2 - \frac{9}{16}x - \frac{1}{16}\right)$  (d)  $k(16x^2 - 9x + 1)$
23. Five years ago, A was thrice as old as B and 10 years hence A shall be twice as old as B. What is the present age of B.
- (a) 15 years (b) 18 years (c) 20 years (d) 22 years
24. Find the least positive value of k for which the equation  $x^2 + kx + 4 = 0$  has real roots.
- (a)  $k = 3$  (b) 4 (c) -3 (d) -4
25. Find the maximum sum of A.P. 40, 38, 36, 34
- (a) 380 (b) 0 (c) 420 (d) None of these
26. In a  $\Delta ABC$ , if  $AB = 6\sqrt{3}$ cm,  $BC = 6$  cm and  $AC = 12$  cm then  $\angle B$  is.
- (a)  $120^\circ$  (b)  $90^\circ$  (c)  $60^\circ$  (d)  $45^\circ$
27. The point's (a, o), (o, b) and (1, 1) are collinear if
- (a)  $2a + b = 1$  (b)  $a + b + ab = 0$  (c)  $a + b - ab = 0$  (d)  $a + b - 2ab = 0$
28.  $\sqrt{\frac{1 + \sin A}{1 - \sin A}}$  equal to
- (a)  $\frac{1 + \cos A}{\sin A}$  (b)  $\frac{1 - \cos A}{\sin A}$  (c)  $\sec A - \tan A$  (d)  $\sec A + \tan A$
29. In the given figure PR is tangent to the circle at P and O is centre of circle then  $\angle POQ = ?$



- (a)  $90^\circ$  (b)  $120^\circ$  (c)  $60^\circ$  (d)  $80^\circ$
30. The median of a given frequency distribution is found graphically with the help of
- (a) Histogram (b) Frequency polygon (c) Frequency curve (d) Ogive

### Social Science (10)

31. What is meaning of word 'das volk'?
- (a) common people of Italy (b) common people of Germany  
 (c) common people of England (d) common people of U.S.A.

32. By whom Swaraj Party was founded?  
(a) C.R. Das and Motilal Nehru  
(b) Baba Ramchandra and Jawahar Lal Nehru  
(c) Mohammad Ali and Saikat Ali  
(d) Subhash Chandra Bose and Jawahar Lal Nehru
33. Which one is an example of Union List subject?  
(a) Police (b) Education (c) Trade (d) Banking
34. Where is headquarter of European Union?  
(a) Geneva, Switzerland (b) Hague, Netherlands  
(c) Brussels, Belgium (d) London, England
35. Which one is a state political party?  
(a) B.J.P. (b) J.J.P. (c) I.N.C. (d) B.S.P.
36. Which one is an example of renewable resources?  
(a) Wind Energy (b) Coal (c) Petroleum products (d) Iron-ore
37. In which country, the slash and burn agriculture is known as Roca?  
(a) Vietnam (b) Srilanka (c) Brazil (d) Mexico
38. Which organization publishes Human Development Report?  
(a) W.H.O. (b) U.N.D.P. (c) UNESCO (d) UNICEF
39. Which one is an example of primary sector?  
(a) Fishing (b) Banking (c) Teaching (d) Manufacturing
40. Name the sector where there is job security, paid holidays, good salary etc.  
(a) Organised sector (b) Unorganised sector  
(c) primary sector (d) private sector

### Aptitude (Reasoning) (10)

**Direction (41-42) :** Find the missing term in the given series.

41. 5824 5242 \_\_\_\_\_ 4247 3823  
(a) 4467 (b) 4718 (c) 4856 (d) 5164
42. Z, X, S, I, R, R, \_\_, \_\_  
(a) G, I (b) J, I (c) J, K (d) J, M
43. Analogy :  
25 : 74 :: 36 : 117 :: 16 : 65 :: 23 : \_\_  
(a) 48 (b) 54 (c) 55 (d) None of these

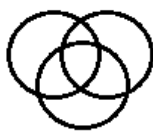
44. If REQUEST is written as S2R52TU, then how will ACID be written?  
(a) 1394                      (b) IC94                      (c) BDJE                      (d) None of these
45. Four players A, B, C and D are holding 4 card each. Each of them has an Ace, a king, a queen and a jack. All of them have all the suits (Spades, Hearts, Clubs and Diamonds)  
(1) A has Ace of spades and queen of Diamonds.  
(2) B has Ace of clubs and king of Diamonds.  
(3) C has queen of clubs and king of spades.  
(4) D has jack of clubs.  
Ace of Diamonds is with  
(a) A                      (b) B                      (c) C                      (d) D
46. Ravi wants to go the University. He starts from his home which is in the East and comes to a crossing. The road to the left end in a theatre, straight ahead is the Hospital. In which Direction is the University?  
(a) North                      (b) South                      (c) East                      (d) West
47. Choose the Vann Diagram which best illustrates the three given classes.  
Window, Wall, Room



(a)



(b)



(c)



(d)

48. If 1<sup>st</sup> October is Sunday, then 1<sup>st</sup> November will be  
(a) Monday                      (b) Tuesday                      (c) Wednesday                      (d) Thursday
49. Find the missing number.

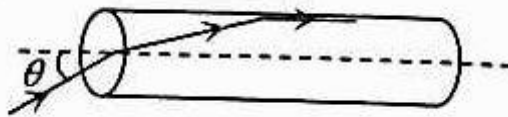
42	44	38
23	55	28
37	-	39

- (a) 22                      (b) 33                      (c) 66                      (d) 77
50. A Fires 5 shots to B is 3 but A kills only once in 3 shots while B kills once in 2 shots. When B has missed 27 times, A has killed  
(a) 30 Birds                      (b) 60 Birds                      (c) 72 Birds                      (d) 90 Birds

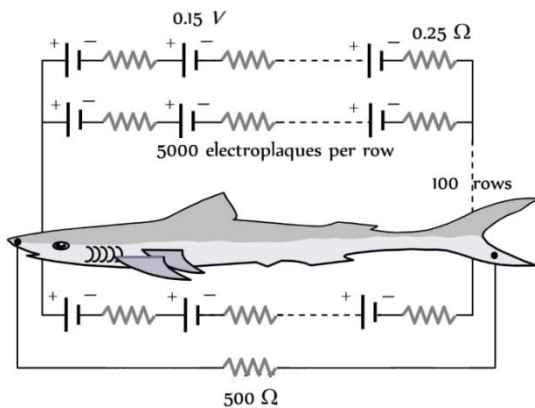
Science (20)

Physics (7)

51. A double convex lens of glass of  $\mu = 1.5$  has radius of curvature of each of its surface is 0.2 m. The power of the lens is  
 (a) + 10 dioptres (b) - 10 dioptres (c) - 5 dioptres (d) + 5 dioptres
52. A transparent solid cylindrical rod has a refractive index of  $\frac{2}{\sqrt{3}}$ . It is surrounded by air. A light ray is incident at the mid-point of one end of the rod as shown in the figure

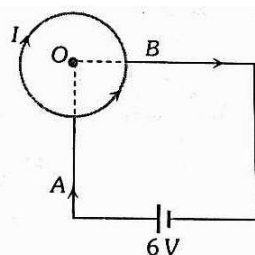


- The incident angle  $\theta$  for which the light ray grazes along the wall of the rod is  
 (a)  $\sin^{-1}(1/2)$  (b)  $\sin^{-1}(\sqrt{3}/2)$  (c)  $\sin^{-1}(2/\sqrt{3})$  (d)  $\sin^{-1}(1/\sqrt{3})$
53. Eels are able to generate current with biological cells called electroplaques. The electroplaques in an eel are arranged in 100 rows, each row stretching horizontally along the body of the fish containing 5000 electroplaques. The arrangement is suggestively shown below. Each electroplaque has an emf of 0.15 V and internal resistance of  $0.25\Omega$

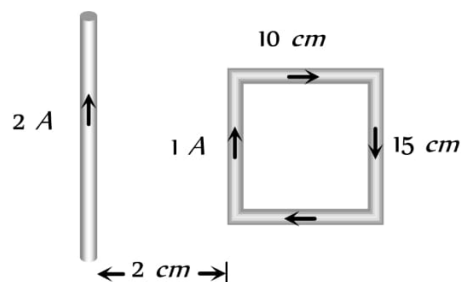


- The water surrounding the eel completes a circuit between the head and its tail. If the water surrounding it has a resistance of  $500\Omega$ , the current an eel can produce in water is about  
 (a) 1.5 A (b) 3.0 A (c) 15 A (d) 30 A
54. A wire is bent in the form of circle of radius 2m. Resistance per unit length of wire is  $1/\pi \Omega/m$ . Battery of 6V is connected between A & B.  $\angle AOB = 90^\circ$ . Find the current through the battery

- (a) 8A  
 (b) 4 A  
 (c) 3A  
 (d) 9A



55. What is the net force on the square coil



- (a)  $25 \times 10^{-7} N$  moving towards wire  
 (b)  $25 \times 10^{-7} N$  moving away from wire  
 (c)  $35 \times 10^{-7} N$  moving towards wire  
 (d)  $35 \times 10^{-7} N$  moving away from wire
56. A 0.1 m long conductor carrying a current of 50 A is held perpendicular to a magnetic field of 1.25 mT. The mechanical power required to move the conductor with a speed of  $1 \text{ m s}^{-1}$  is  
 (a) 62.5 mW (b) 625 mW (c) 6.25 mW (d) 12.5 mW
57. The focal lengths of the objective and eye lenses of a telescope are respectively 200 cm and 5 cm. The maximum magnifying power of the telescope will be  
 (a) - 40 (b) - 48 (c) - 60 (d) - 100

### Chemistry (7)

58. Among the elements B, Mg, Al and K, the correct order of increasing metallic character is  
 (a)  $B < Al < Mg < K$  (b)  $B < Mg < Al < K$   
 (c)  $Mg < B < Al < K$  (d)  $Mg < Al < B < K$
59. The species Ar,  $K^+$  and  $Ca^{2+}$  contain the same number of electrons. In which order do their radii increase?  
 (a)  $Ca^{2+} < K^+ < Ar$  (b)  $K^+ < Ar < Ca^{2+}$   
 (c)  $Ar < K^+ < Ca^{2+}$  (d)  $Ca^{2+} < Ar < K^+$
60. Which of the following species cannot act as both Bronsted acid and base?  
 (a)  $H_2O$  (b)  $HCO_3^-$  (c)  $HSO_4^-$  (d)  $NH_2^-$
61. The IUPAC name for the formula
- $$\begin{array}{c} CH_3 \\ | \\ CH_3 - C = CH - COOH \end{array}$$
- is
- (a) 2-Methylbut-2-enoic acid (b) 3-Methylbut-3-enoic acid  
 (c) 3-Methylbut-2-enoic acid (d) 2-Methylbut-3-enoic acid



62. For the redox reaction,  
 $\text{MnO}_4^- + \text{C}_2\text{O}_4^{2-} + \text{H}^+ \rightarrow \text{Mn}^{2+} + \text{CO}_2 + \text{H}_2\text{O}$   
The correct coefficients of the reactants for the balanced equation are
- |     | $\text{MnO}_4^-$ | $\text{C}_2\text{O}_4^{2-}$ | $\text{H}^+$ |
|-----|------------------|-----------------------------|--------------|
| (a) | 16               | 5                           | 2            |
| (b) | 2                | 5                           | 16           |
| (c) | 2                | 16                          | 5            |
| (d) | 5                | 16                          | 2            |
63. Chemical compound 'A' is used to remove temporary hardness from water. It reacts with  $\text{Na}_2\text{CO}_3$  to generate caustic soda. When  $\text{CO}_2$  is bubbled through 'A', it turns cloudy. What is the chemical formula of 'A'?
- (a)  $\text{CaCO}_3$                       (b)  $\text{CaO}$                       (c)  $\text{Ca(OH)}_2$                       (d)  $\text{Ca(HCO}_3)_2$
64. Calamine, malachite, magnetite and cryolite respectively are
- (a)  $\text{ZnSO}_4$ ,  $\text{Cu(OH)}_2$ ,  $\text{Fe}_3\text{O}_4$ ,  $\text{Na}_3\text{AlF}_6$                       (b)  $\text{ZnCO}_3$ ,  $\text{CuCO}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Na}_3\text{AlF}_6$   
(c)  $\text{ZnSO}_4$ ,  $\text{CuCO}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{AlF}_3$                       (d)  $\text{ZnCO}_3$ ,  $\text{CuCO}_3$ ,  $\text{Cu(OH)}_2$ ,  $\text{Fe}_3\text{O}_4$ ,  $\text{Na}_3\text{AlF}_6$

### Biology (6)

65. Energy flow and energy transformation in living system strictly conform to the
- (a) law of limiting factors                      (b) Liebig's law of minimum  
(c) law of thermodynamics                      (d) Shelford's law of tolerance
66. Biodiversity Act of India was passed by the parliament in year
- (a) 1996                      (b) 1992                      (c) 2002                      (d) 2000
67. Which of the following hormone is not the secretory product of human placenta?
- (a) Prolactin                      (b) Human gonadotropin hormones  
(c) Progesterone                      (d) Oestrogen
68. Choose the correct sequence.
- (a) Pulmonary vein → Pulmonary artery → Left auricle → Right ventricle  
(b) Pulmonary artery → Right auricle → Left ventricle → Pulmonary vein  
(c) Right auricle → Pulmonary artery → Pulmonary vein → Left ventricle  
(d) Left ventricle → Pulmonary vein → Pulmonary artery → Right auricle
69. Which one of the following is an example of chemotropism?
- (a) Growth of climbers towards a support  
(b) Growth of stem away from water  
(c) Growth of root away from light  
(d) Growth of pollen tube towards to ovary

70. The offspring resulting from a cross between two pure homozygous recessives would be
- (a) 50% homozygous recessive and 50% homozygous dominant
  - (b) 75% homozygous recessive and 25% heterozygous dominant
  - (c) 75% homozygous recessive and 25% homozygous dominant
  - (d) 100% homozygous recessive