

ALL INDIA RPS OLYMPIAD 2020

(Organized by RPS Education Society Mahendergarh)

M.M. 70

Class 10th

Time: 70 Mins.

English (10)

1. "Will O' the wisp" means:
a) Anything which eludes or deceives
b) To act in a childish way
c) To act in a foolish way
d) To have desires unbaked by efforts.
Find the error parts (if possible) in question no. 2, 3, 4.
2. (i) Had the police (ii) not reached here on (iii) time, the traders would have robbed. (iv) No error.
a) i b) ii c) iii d) iv
3. I am looking/forward to going/ to London. / No error
(i) (ii) (iii) (iv)
a) i b) ii c) iii d) iv
4. Since he is a/liar so I do/not trust him./No error
(i) (ii) (iii) (iv)
a) i b) ii c) iii d) iv
5. Identify the wrong sentence:
a) I went home by my car. b) I went to his home.
c) I decided to go to Ram's home. d) I went to home to bring my bag.
6. Find the correct sentence:
a) By the time I reached the station, the train will left.
b) By the time I reached the station, the train will have left.
c) By the time I reach the station, the train will left.
d) By the time I reach the station, the train will have left.
7. She said, "If I get selected, I need not take any exam further". (Change into indirect speech)
a) She said that if she got selected she would not have to take any exam further.
b) She told that if she get selected she need not take any exam further.
c) She said that if she gets selected she would not take any exam further.
d) She said that if she got selected she would not take any exam further.
8. You _____ sit outside the office. (Order)
a) will b) can c) shall d) could
9. _____ Physics of Mohan are poor.
a) A b) The c) An d) No article

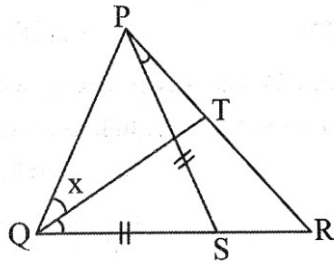
10. Do you know why he has failed?

The underlined part is:

- a) Main clause b) Noun clause c) Adjective clause d) Adverb clause

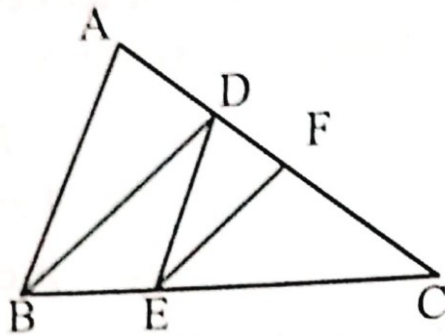
Mathematics (20)

11. In the following figure $QT \perp PR$ and $QS = PS$. If $\angle TQR = 40^\circ$ and $\angle RPS = 20^\circ$ then value of x is

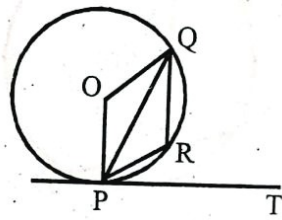


- a) 80° b) 25° c) 15° d) 35°
12. If $m = \frac{\cos A}{\cos B}$ and $n = \frac{\cos A}{\sin B}$, then $(m^2 + n^2) \cos^2 B$ is equal to
- a) m^2 b) n^2 c) $m^2 + n^2$ d) $m + n$
13. If $p + q + r = 0$ then the value of $\frac{2p^2(q+r)+2q^2(p+r)+2r^2(p+r)}{pqr}$ will be
- a) $3pqr$ b) $\frac{1}{pqr}$ c) 6 d) -6
14. If $\frac{x^2 - bx}{ax - c} = \frac{m-1}{m+1}$, has roots which are numerically equal but of opposite signs, the value of m must be
- a) $(a - b)/(a + b)$ b) $(a + b)/(a - b)$ c) c d) $\frac{1}{c}$
15. x_1, x_2, x_3, \dots , are in A. P. If $x_1 + x_7 + x_{10} = -6$ and $x_3 + x_8 + x_{12} = -11$, then $x_3 + x_8 + x_{22} = ?$
- a) -21 b) -15 c) -18 d) -31
16. If $(x + a)$ is the factor of the polynomials $(x^2 + px + q)$ and $(x^2 + mx + n)$ then the value of 'a' is
- a) $\frac{n-q}{m-p}$ b) $\frac{m-p}{n-q}$ c) $\frac{q-n}{m-p}$ d) $\frac{m-p}{q-n}$
17. The lowest common multiple of two numbers is 14 times their greatest common divisor. The sum LCM and GCD is 600. If one number is 80, then other number is
- a) 600 b) 520 c) 280 d) 40
18. The sum of the length, breadth and height of a rectangular parallelepiped is 25cm and its whole surface area is 264 sq. cm. The area of the square whose sides are equal to the length of the diagonal of that parallelepiped is

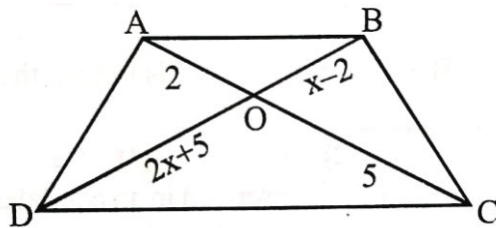
- a) 256 sq. cm. b) 361 sq. cm. c) 225 sq. cm. d) 324 sq. cm.
19. If two angles of a triangle are $87^{\circ}24'54''$ and $32^{\circ}35'6''$, the third angle is
 a) $\frac{\pi}{6}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{4}$
20. The sum of the reciprocals of the roots of the equation $\frac{101}{123}x + \frac{1}{x} + 1 = 0$ is
 a) $\frac{-101}{123}$ b) $\frac{123}{101}$ c) -1 d) 1
21. If $a = \sqrt{6 - \sqrt{11}}$ and $b = \sqrt{6 + \sqrt{11}}$ then the value of $(a + b)$ is:
 a) $\sqrt{22}$ b) $2\sqrt{11}$ c) $\sqrt{6}$ d) $\sqrt{12}$
22. Angle between the lines $6 + x = 0$ and $3 - y = 0$ will be
 a) 0° b) 90° c) 180° d) 60°
23. In the given figure, $\triangle ABC$ has points D and F on AC and point E on BC such that $DE \parallel AB$ and $EF \parallel BD$. If $CF = 4\text{cm}$ and $AC = 9\text{cm}$, what is the length of DC?



- a) 7cm b) 6cm c) 5cm d) 4cm
24. In $\triangle ABC$, $XY \parallel BC$ and XY divides the triangle into two parts of equal area. the value of $\frac{AX}{BX}$ is
 a) $\sqrt{2} - 1$ b) $\frac{\sqrt{2}}{2}$ c) $\frac{2}{\sqrt{2}}$ d) $\sqrt{2} + 1$
25. If $\cos 43^{\circ} = \frac{x}{\sqrt{x^2 + y^2}}$, then the value of $\tan 47^{\circ}$.
 a) $\frac{x}{y}$ b) $\frac{y}{x}$ c) $\frac{x}{\sqrt{x^2 + y^2}}$ d) $\frac{y}{\sqrt{x^2 + y^2}}$
26. In the figure, PQ is a chord of a circle with centre O and PT is the tangent at P such that $\angle QPT = 70^{\circ}$. Then the measure of $\angle PRQ$ is equal to



- a) 135° b) 150° c) 120° d) 110°
27. If the eight digit number 2575d568 is divisible by 54 and 87, the value of the digit 'd' is:
 a) 4 b) 7 c) 0 d) 8
28. In a given figure in trapezium ABCD if $AB \parallel CD$ then value of x is



- a) $\frac{29}{8}$ b) $\frac{8}{29}$ c) 20 d) $\frac{1}{20}$
29. If $x + y + z = 1, x^2 + y^2 + z^2 = 2$ and $x^3 + y^3 + z^3 = 3$ then the value of xyz is _____.
 a) $1/5$ b) $1/6$ c) $1/7$ d) $1/8$
30. By eliminating θ from $x = a \cos^3 \theta, y = a \sin^3 \theta$ the expression is
 a) $\sqrt{x} + \sqrt{y} = \sqrt{a}$ b) $x^2 + y^2 = a^2$ c) $x^{2/3} + y^{2/3} = a^{2/3}$ d) none of these

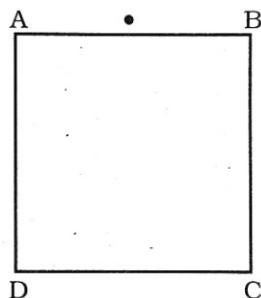
Social Science (10)

31. By whom the congress of Vienna was hosted in 1815?
 a) Victor Emmanuel b) Duke Metternich
 c) Guiseppe Mazzini d) Count Camillo de Cavour
32. Which one of the following statements is not related to the Gandhi-Irwin Pact?
 a) M.K.Gandhiji agreed to participate in the Second Round Table Conference.
 b) The British agreed to release the political prisoners.
 c) M.K.Gandhiji decided to call of the Civil Disobedience Movement.
 d) M.K.Gandhiji agreed not to launch any further mass agitation against the British.
33. Match the columns
- | | |
|------------------------------|----------------------------|
| Column A | Column B |
| A) Solar and Wind Energy | 1) Over irrigation |
| B) Capacity to hold moisture | 2) Obtained from Biosphere |

- C) Biotic Resources 3) Black Soil
D) Land degradation in Punjab 4) Renewable Resources
- a) A - 4, B - 3, C - 1, D - 2 b) A - 3, B - 4, C - 2, D - 1
c) A - 4, B - 3, C - 2, D - 1 d) A - 1, B - 2, C - 3, D - 4
- 34.. Which one of the following minerals is a ferrous mineral?
a) Cobalt b) Tin c) Lead d) Copper
35. Which is the only industry in India that is self-reliant?
a) Iron and Steel b) Textile Industry c) Sugar Industry d) Electrical Industry
36. Natural goods are produced by which of the following sector?
a) Tertiary Sector b) Secondary Sector c) Primary Sector d) None of the above
37. What is the main source of income for the bank?
a) The interest from the loan
b) Funds from government treasury
c) The surplus funds from the deposits
d) The difference between what is charged from the borrowers and what is paid to depositors
38. Distribution of powers between the centre and states is mentioned in which schedule of Indian Constitution?
a) III b) IV c) VI d) VII
39. What is the numbers of women representatives in the 17th Lok Sabha?
a) 78 b) 77 c) 76 d) 75
40. Which of the following amendment is known as Anti Defection Law?
a) 42nd b) 44th c) 52nd d) 61st

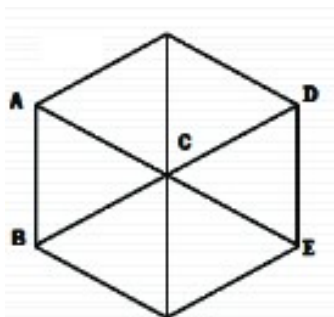
Science-20 (PCB-7+7+6)

41. A rectangular block of glass ABCD has a refractive index 1.6. A pin is placed midway on the face AB (See fig.). When observed from the face AD, the pin shall



- a) appear to be near A. b) appear to be near D.
c) appear to be at the centre of AD. d) not be seen at all.

42. A cylindrical vessel of diameter 12cm contains $736\pi \text{ cm}^3$ of water. A cylindrical solid glass piece of diameter 8cm and height 8 cm is placed in the vessel. If a point object at the bottom of the vessel under the glass piece is seen by paraxial rays, locate the image of this object and find the total apparent shift of the bottom. Refractive index of water = $4/3$ and refractive index of glass = $3/2$.
- a) $\frac{20}{3}$ cm b) $\frac{20}{9}$ cm c) $\frac{8}{3}$ cm d) $\frac{8}{9}$ cm
43. A monkey is holding onto one end of a light rope which passes over a frictionless pulley and at the other end there is a plane mirror which has a mass equal to the mass of the monkey. At equilibrium the monkey is able to see her image in the mirror. Consider three situations:
I. The monkey climbs up the rope.
II. The monkey tries to push the rope down.
III. The monkey lets go of the rope.
Under which of the above conditions does the monkey continue to see her image?
a) I only b) II only c) III only d) I, II and III
44. A circular coil expands radially in a region of magnetic field and not electromotive force is produced in the coil. This can be because
I) the magnetic field is constant.
II) the magnetic field is in the same plane as the circular coil and it may or may not vary.
III) the magnetic field has a perpendicular (to the plane of the coil) component whose magnitude is decreasing suitably.
IV) there is constant magnetic field in the perpendicular (to the plane of the coil) direction.
Which of the following is true?
a) I and II b) II and III c) III and IV d) All of these
45. Twelve identical wires are connected in the plane as shown in the figure. The six outer wires make a regular hexagon and the remaining six join the vertices of this hexagon with common centre at C. Each wire has resistance of 20Ω . Calculate effective resistance between A and B. (If you connect a battery across A and B, the current in AC and CB are the same and those in DC and CE are the same).



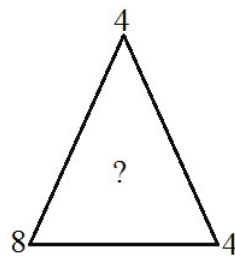
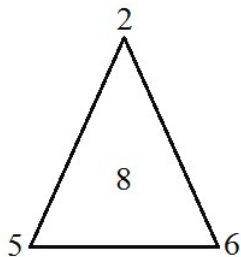
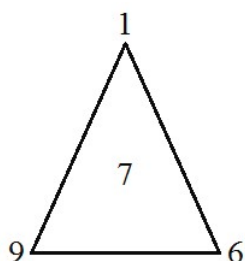
- a) 11Ω b) 12Ω c) 13Ω d) 14Ω

46. A bar magnet of mass 0.2 kg hangs from a string. A metal sphere of mass 0.5 kg is held underneath in contact with the magnet by magnetic force 20 N. An upward force is now applied to the string that develops tension T in the string. Calculate the maximum possible value of T for which the sphere is in contact with the magnet.
- a) 28N b) 38N c) 48N d) 58N
47. Latent heat is the amount of heat given to the unit mass of substance to change its state. One can provide heat by various means. Electric heater is also used for this purpose. There are three identical containers P, Q and R and these have identical amount of ice at 0°C . These are placed in identical surroundings having constant temperature. These all the three containers are having identical heating elements in them. Heating element of P is operated at 300V and it takes 4 minutes to melt the complete ice contained in it. The heating element of Q is operated at 200V and it takes 20 minutes to melt the complete ice contained in it. If the heating element of R is operated at 100V then how much time will it take to melt its complete ice.
- a) 40 min b) 60 min
c) 70 min d) It can never melt the ice completely
48. Select the IUPAC name for the compound below.
- $$\begin{array}{c}
 \text{O} \\
 \parallel \\
 (\text{CH}_3)_2\text{CHCH}_2\text{CH}-\text{OH} \\
 | \\
 \text{CH}_3
 \end{array}$$
- a) 1, 1, 3 - trimethyl butanoic acid
b) 2, 4 - dimethylpentanoic acid
c) 1 - hydroxy - 2, 4 - dimethylpentanoic acid
d) 2 - carboxy isohexane
49. Which of the following dissolves in water to give a neutral solution
- a) $(\text{NH}_4)_2\text{SO}_4$ b) $\text{Ba}(\text{NO}_3)_2$ c) CrCl_3 d) CuSO_4
50. Electron affinities of O, S, F and Cl are in the order:
- a) $\text{O} < \text{S} < \text{F} < \text{Cl}$ b) $\text{S} < \text{O} < \text{F} < \text{Cl}$ c) $\text{S} < \text{Cl} < \text{O} < \text{F}$ d) $\text{S} < \text{O} < \text{F} < \text{Cl}$
51. Which of the following has the greatest concentration of H^+ ions?
- a) 1 M HCl b) 1 M H_3PO_2 c) 1 M H_2SO_4 d) 1 M H_2CO_3
52. Reaction of water with aluminium carbide gives a colourless gas. The gas is:
- a) Propane b) Acetylene c) Ethane d) Methane

53. Froth Floatation Process is used for concentration of:
 a) Chalcopryrite b) Bauxite c) Haematite d) Calamine
54. How many optically active stereoisomers are possible for butane-2, 3-diol?
 a) 1 b) 2 c) 3 d) 4
55. The hepatic portal vein drains blood to liver from: -
 a) Stomach b) Kidney c) Intestine d) Heart
56. Fruit and leaf fall at early stages can be prevented by application of
 a) Ethylene b) Auxin c) Gibberellic acid d) Cytokinin
57. The function of copper ions in copper releasing IUD's is.
 a) They inhibit gametogenesis
 b) They make uterus unsuitable for implantation
 c) They inhibit ovulation
 d) They suppress sperm motility & fertilising capacity of sperms
58. Which one of following is related to Ex-situ conservation of threatened animals & plants?
 a) Biodiversity hot spot b) Amazon Rainforest
 c) Himalayan Region d) Wildlife Safari parts
59. Functional megaspore in angiosperm develops into -
 a) Endosperm b) Embryo sac c) Embryo d) Ovule
60. Which one from these given below is the period for Mendel's hybridization experiments?
 a) 1840 - 1850 b) 1857 - 1869 c) 1870 - 1877 d) 1856 - 1863

Aptitude (10)

61. Suppose you have a clock with minute and hour hands and you switch their places to form another correct time. How many such times can be formed in a clock?
 a) 143 b) 144 c) 145 d) 146
62. Find the missing character in the given figures?



- a) 15 b) 13 c) 11 d) 16
63. One white square is surrounded by four black squares, two white squares are surrounded by six black squares, three white squares are surrounded by 8 black squares. What is the largest possible number of white squares surrounded by n black squares?
 a) $\frac{n}{2} - 1$ b) $\frac{n}{2} + 1$ c) $n + 2$ d) $2(n + 1)$

