



EXCELLENCE IN EDUCATION

International Olympiad Foundation

14+

OLYMPIADS

MCQ

FORMAT

0

NEGATIVE MARKS

SAMPLE PAPER

International Olympiad Foundation

OLYMPIAD

Mathematics Olympiad

International Olympiad Foundation (IOF) · www.iof.education

CLASS / GRADE

Class 11

SUBJECT

IFMO

DURATION

60 Min

MAX MARKS

50

GENERAL INSTRUCTIONS

- All questions are Multiple Choice Questions (MCQs) with options A, B, C, D, E
- Each correct answer carries 1 mark. No negative marking for wrong answers.
- Rough work should be done separately. Do not write on question paper.

PAPER HIGHLIGHTS

- **Multiple Choice Questions (MCQ)**
Five options per question (A, B, C, D, E). Select the single most appropriate answer.
- **No Negative Marking**
1 mark per correct answer. Zero deductions — attempt every question.
- **Conducted by IOF**
International Olympiad Foundation — fostering excellence among students across India.

SUBJECTS

- Cyber
- English
- Entrepreneurship
- Mathematics
- Commerce
- Economics
- GK & Current Affairs
- Science
- Western Music
- Sanskrit
- Indian Music
- Hindi
- Reasoning & Aptitude
- Spell Talent

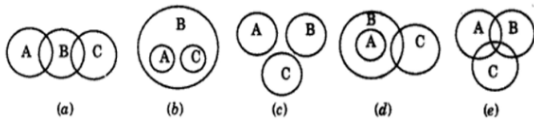
ALL IOF OLYMPIAD PROGRAMMES

IFCO International Foundation Cyber Olympiad	IFEOL International Foundation English Olympiad	IFEnO International Foundation Entrepreneurship Olympiad	IFMO International Foundation Mathematics Olympiad	ICS Institute of Company Secretaries of India Commerce Olympiad	IFEcO International Foundation Economics Olympiad	IFGCO International Foundation General Knowledge & Current Affairs Olympiad
IFSO International Foundation Science Olympiad	IFWMuO International Foundation Western Music Olympiad	IFSaO International Foundation Sanskrit Olympiad	IFIMuO International Foundation Indian Music Olympiad	IFHO International Foundation Hindi Olympiad	IFRAO International Foundation Reasoning & Aptitude Olympiad	IFSTO International Foundation Spell Talent Olympiad

Q1. A child is looking for his father. He went 90 meters in the east before turning to his right. He went 20 meters before turning to his right again to look for his father at his uncle's place 30 meters from this point. His father was not there. From there he went 100 meters to his north before meeting his father in a street. How far did the son meet his father from starting point? [+1]

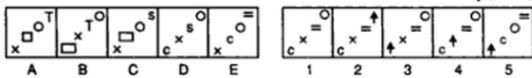
- A. 80 metres
- B. 100 metres
- C. 140 metres
- D. 260 metres
- E. None of these

Q2. Given below are five patterns represented by circles A, B and C which indicate the logical relationship between and among the respective descriptions. On the basis of description, decide which of the given options best indicates the logical relationship between. Gold , Ornament and Silver [+1]



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. (e)

Q3. Choose the correct option to continue the series. [+1]



- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

Q4. Which word completes the second pair in the same way as first pair? [+1]

Nautilus : Fish :: Teal : ?

- A. Chicken
- B. Dolphin
- C. Duck
- D. Pigeon
- E. None of these

Q5. Select the lettered pair that has the same relationship as the original pair of words. [+1]

Judge : Adjudicate [-0]

- A. Researcher : Emendate
- B. Mediator : Reconcile
- C. Appellant : Implore
- D. Advocate : Jury
- E. None of these

Q6. Choose the odd one out. [+1]

Gorges , Bars , Canyons , Meanders , Rapids [-0]

- A. Gorges
- B. Bars
- C. Canyons
- D. Meanders
- E. Rapids

Q7. Four of them are alike in a certain way while one is different. Choose the odd one. [+1]

AOT , CPA , REB , TIW , QUD [-0]

- A. AOT
- B. CPA
- C. REB
- D. TIW
- E. QUD

Q8. Choose the correct option to complete the series. [+1]

11, 10, ?, 100, 1001, 1000, 10001 [-0]

- A. 110
- B. 101
- C. 111
- D. 1100
- E. None of these

Q9. Choose the correct option to continue the series [+1]

BEI, NQU, ZCG, ? [-0]

- A. LOR
- B. LOS
- C. LNR
- D. KMQ
- E. None of these

Q10. In a certain code language, 'po ki top ma' means 'Usha is playing cards'; 'kop ja ki ma' means 'Asha is playing tennis'; 'ki top sop ho' means 'they are playing football'; and 'po sur kop' means 'cards and tennis' . Which word in that language means 'Asha' ? [+1]
[-0]

- A. ja
- B. ma
- C. kop
- D. top
- E. ki

Q11. If the code for AMRITSAR in a certain language is FRWNYXFW. What word will be coded as HMJSSNF? [+1]

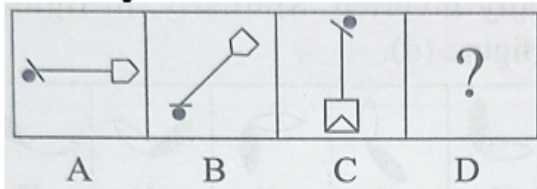
- A. CHENINA [-0]
- B. CHENNAI
- C. CHNNAIE
- D. CHENNIA
- E. None of these

Q12. D, the son-in-law of B, is the brother-in-law of A who is the brother of C. How is A related to B? [+1]

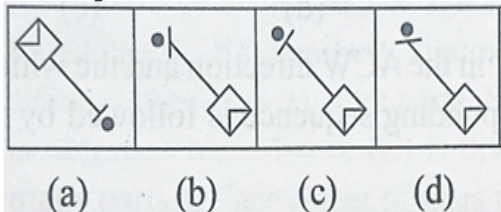
- A. Brother [-0]
- B. Son
- C. Father
- D. Data Inadequate
- E. None of these

Q13. Which figure completes the second pair in the same way as first pair? [+1]

Problem Figure



Answer Figure



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. None of these

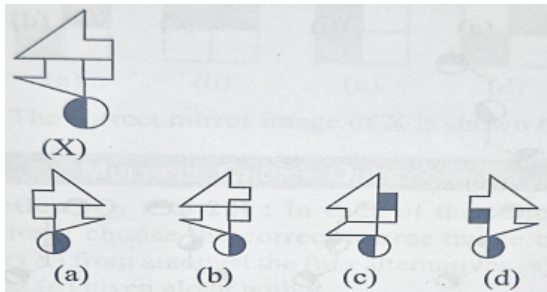
Q14. In a row of boys facing the North, A is sixteenth from the left end and C is sixteenth from the right end. B, who is fourth to the right of A, is fifth to the left of C in the row. How many boys are there in the row? [+1]

- A. 39
- B. 40
- C. 41
- D. 42
- E. None of these

[+1]

[-0]

Q15. Choose the correct mirror image of the figure (X) when mirror is placed vertically on the right side of the figure(X). [+1]



[+1]

[-0]

- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. None of these

Q16. Choose the correct option.

If $a > 0$ and $z = \frac{(1+i)^2}{a-i}$, has magnitude $\sqrt{\frac{2}{5}}$, then \bar{z} is equal to

- A. $\frac{1}{5} - \frac{3}{5}i$
- B. $-\frac{1}{5} - \frac{3}{5}i$
- C. $-\frac{1}{5} + \frac{3}{5}i$
- D. $-\frac{3}{5} - \frac{1}{5}i$

[+1]

[-0]

- A. A
- B. B
- C. C
- D. D
- E. None of these

Q17. Let $z = x + iy$ be a complex number where, x and y are integers. Then, the area of the rectangle whose vertices are the root of the equation $z\bar{z}^3 + \bar{z}z^3 = 350$, is

- A. 48
- B. 32
- C. 40
- D. 80
- E. None of these

[+1]

[-0]

Q18. Choose the correct option.

[+1]

The complex numbers $z = x + iy$ which satisfy the equation $\left| \frac{z-5i}{z+5i} \right| = 1$, lie on

[-0]

- A. the X-axis
- B. the straight line $y=5$
- C. a circle passing through the origin
- D. the Y- axis
- E. None of the above

Q19. Find the value of λ such that sum of the squares of the roots of the quadratic equation, $x^2 + (3 - \lambda)x + 2 = \lambda$ has the least value is

[+1]

[-0]

- A. $\frac{4}{9}$
- B. 1
- C. $\frac{15}{8}$
- D. 2
- E. None of these

Q20. For the equation $3x^2 + px + 3 = 0$, $p > 0$, if one of the root is square of the other, then p is equal to

[+1]

- A. $1/3$
- B. 1
- C. 3
- D. $2/3$
- E. None of these

[-0]

Q21. Choose the correct option.

[+1]

Let $z \in \mathbb{C}$ with $\text{Im}(z) = 10$ and it satisfies $\frac{2z-n}{2z+n} = 2i - 1$ for some natural number n , then

[-0]

- A. $n = 20$ and $\text{Re}(z) = -10$
- B. $n = 40$ and $\text{Re}(z) = 10$
- C. $n = 40$ and $\text{Re}(z) = -10$
- D. $n = 20$ and $\text{Re}(z) = 10$
- E. None of these

- Q22.** If the sum and product of the first three terms in an AP are 33 and 1155, respectively, then a value of its 11th term is [+1]
[-0]
- A. 25
 B. -36
 C. -29
 D. -35
 E. None of these
- Q23.** If three distinct numbers a, b and c are in GP and the equations $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a common root, then which one of the following statements is correct? [+1]
[-0]
- A. d, e and f are in GP
 B. $\frac{d}{a}$, $\frac{e}{b}$ and $\frac{f}{c}$ are in AP
 C. d, e and f are in AP
 D. $\frac{d}{a}$, $\frac{e}{b}$ and $\frac{f}{e}$ are in GP
 E. None of these
- Q24.** Three positive numbers form an increasing GP, If the middle term in this GP is doubled, then new numbers are in AP. Then, the common ratio of the GP is [+1]
[-0]
- A. $\sqrt{2} + \sqrt{3}$
 B. $3 + \sqrt{2}$
 C. $2 - \sqrt{3}$
 D. $2 + \sqrt{3}$
 E. None of these
- Q25.** The number of seven-digit integers, with sum of the digits equal to 10 and formed by using the digits 1, 2 and 3 only, is [+1]
[-0]
- A. 55
 B. 66
 C. 77
 D. 88
 E. None of these
- Q26.** Suppose that 20 pillars of the same height have been erected along the boundary of a circular stadium. If the top of each pillar has been connected by beams with the top of all its non-adjacent pillars, then the total number of beams is [+1]
[-0]
- A. 180
 B. 210
 C. 170
 D. 190
 E. None of these

- Q27.** There are m men and two women participating in a chess tournament. Each participant plays two games with every other participant. If the number of games played by the men between themselves exceeds the number of games played between the men and the women by 84, then the value of m is [+1]
[-0]
- A. 12
B. 11
C. 9
D. 7
E. None of these
- Q28.** A committee of 11 members is to be formed from 8 males and 5 females. If m is the number of ways the committee is formed with at least 6 males and n is the number of ways the committee is formed with at least 3 females, then [+1]
[-0]
- A. $m = n = 68$
B. $m + n = 68$
C. $m = n = 78$
D. $n = m - 8$
E. None of these
- Q29.** Five balls of different colours are to be placed in three boxes of different sizes. Each box can hold all five. In how many different ways can we place the balls so that no box remains empty? [+1]
[-0]
- A. 200
B. 250
C. 300
D. 320
E. None of these
- Q30.** Choose the correct option. [+1]
[-0]
- The coefficient of x^{18} in the product $(1 + x)(1 - x)^{10}(1 + x + x^2)^9$ is [-0]
- A. 84
B. -126
C. -84
D. 126
E. None of these

Q31.

[+1]

In the binomial expansion of $(a - b)^n$, $n \geq 5$ the sum of the 5th and 6th terms is zero. Then, a/b equals

[-0]

A. $\frac{n-5}{6}$

B. $\frac{n-4}{5}$

C. $\frac{5}{n-4}$

D. $\frac{6}{n-5}$

E. None of these

Q32. A person throws two fair dice. He wins ₹ 15 for throwing a doublet (same numbers on the two dice), wins ₹ 12 when the throw results in the sum of 9, and loses ₹ 6 for any other outcome on the throw. Then, the expected gain/loss (in ₹) of the person is

[+1]

[-0]

A. $\frac{1}{2}$ loss

B. $\frac{1}{4}$ loss

C. $\frac{1}{2}$ loss

D. 2 gain

E. None of these

Q33. In a random experiment, a fair die is rolled until two fours are obtained in succession. The probability that the experiment will end in the fifth throw of the die is equal to

[+1]

[-0]

A. $\frac{175}{6^5}$

B. $\frac{225}{6^5}$

C. $\frac{200}{6^5}$

D. $\frac{150}{6^5}$

A. A

B. B

C. C

D. D

E. None of these

Q34. Seven white balls and three black balls are randomly placed in a row. The probability that no two black balls are placed adjacently, equals [+1]

A. $\frac{1}{2}$

B. $\frac{7}{15}$

C. $\frac{2}{15}$

D. $\frac{1}{3}$

E. None of these

Q35. Two events A and B have probabilities 0.25 and 0.50, respectively. The probability that both A and B occur simultaneously is 0.14. Then, the probability that neither A nor B occurs, is [+1]

A. 0.39

B. 0.25

C. 0.11

D. 0.16

E. None of these

Q36. Choose the correct option. [+1]

If $\lim_{x \rightarrow 1} \frac{x^2 - ax + b}{x - 1} = 5$, then $a + b$ is equal to [-0]

A. - 4

B. 1

C. - 7

D. 5

E. None of these

Q37. Choose the correct option.

[+1]

If $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$ then k is

[-0]

A. $\frac{4}{3}$

B. $\frac{3}{8}$

C. $\frac{3}{2}$

D. $\frac{8}{3}$

E. None of these

Q38. Find the value of :

[+1]

$\lim_{x \rightarrow 0} \frac{\sin^2 x}{\sqrt{2} - \sqrt{1 + \cos x}}$ equals

[-0]

A. $4\sqrt{2}$

B. $\sqrt{2}$

C. $2\sqrt{2}$

D. 4

E. None of these

Q39. The equation $y = \sin x \sin(x + 2) - \sin^2(x + 1)$ represents a straight line lying in

[+1]

A. second and third quadrants only

[-0]

B. first, second and fourth quadrants

C. first, third and fourth quadrants

D. third and fourth quadrants only

E. None of these

- Q40.** Lines are drawn parallel to the line $4x - 3y + 2 = 0$, at a distance $\frac{3}{5}$ from the origin. Then which one of the following points lies on any of these lines? [+1]
[-0]
- A. $\left(-\frac{1}{4}, -\frac{2}{3}\right)$ B. $\left(-\frac{1}{4}, \frac{2}{3}\right)$
 C. $\left(\frac{1}{4}, -\frac{1}{3}\right)$ D. $\left(\frac{1}{4}, \frac{1}{3}\right)$
- A. A
 B. B
 C. C
 D. D
 E. None of these
- Q41.** The region represented by $|x - y| \leq 2$ and $|x + y| \leq 2$ is bounded by a [+1]
[-0]
- A. rhombus of side length 2 units
 B. rhombus of area $8\sqrt{2}$ sq units
 C. square of side length $2\sqrt{2}$ units
 D. square of area 16 sq units
 E. None of these
- Q42.** The lines $2x - 3y = 5$ and $3x - 4y = 7$ are diameters of circle of area 154sq units. Then, the equation of this circle is [+1]
[-0]
- A. $x^2 + y^2 + 2x - 2y = 62$
 B. $x^2 + y^2 + 2x - 2y = 47$
 C. $x^2 + y^2 - 2x + 2y = 47$
 D. $x^2 + y^2 - 2x + 2y = 62$
 E. None of these
- Q43.** A circle touching the X-axis at (3, 0) and making an intercept of length 8 on the Y-axis passes through the point [+1]
[-0]
- A. (3, 10)
 B. (3, 5)
 C. (2, 3)
 D. (1, 5)
 E. None of these

- Q44.** If the area of the triangle whose one vertex is at the vertex of the parabola, $y^2 + 4(x - a^2) = 0$ and the other two vertices are the points of intersection of the parabola and Y-axis, is 250sq units, then a value of 'a' is [+1]
[-0]
- A. $5\sqrt{5}$
 B. 5
 C. $5(2^{1/3})$
 D. $(10)^{2/3}$
 E. None of these
- Q45.** Axis of a parabola lies along X-axis. If its vertex and focus are at distances 2 and 4 respectively from the origin, on the positive X-axis, then which of the following points does not lie on it? [+1]
[-0]
- A. (4, -4)
 B. (6, $4\sqrt{2}$)
 C. (8, 6)
 D. (5, $2\sqrt{6}$)
 E. None of these
- Q46.** Choose the correct option. [+1]
[-0]
- Given $A = \sin^2 \theta + \cos^4 \theta$, then for all real values of θ
- A. $1 \leq A \leq 2$ B. $\frac{3}{4} \leq A \leq 1$
 C. $\frac{13}{16} \leq A \leq 1$ D. $\frac{3}{4} \leq A \leq \frac{13}{16}$
- A. A
 B. B
 C. C
 D. D
 E. None of these
- Q47.** Choose the correct option. [+1]
[-0]
- If α and β are the roots of $x^2 + px + q = 0$ and α^4, β^4 are the roots of $x^2 - rx + s = 0$, then the equation $x^2 - 4qx + 2q^2 - r = 0$ has always
- A. two real roots
 B. two positive roots
 C. two negative roots
 D. one positive and one negative root
 E. None of these

Q48. Choose the correct option.

[+1]

Let $f(\theta) = \sin\theta (\sin\theta + \sin 3\theta)$ Then $f(\theta)$

[-0]

A. ≥ 0 , only when $\theta \geq 0$

B. ≤ 0 , for all real θ

C. ≥ 0 , for all real θ

D. ≤ 0 , only when $\theta \leq 0$

A. A

B. B

C. C

D. D

E. None of these

Q49. The domain of definition of the function

[+1]

$$y = \frac{1}{\log_{10}(1-x)} + \sqrt{x+2} \text{ is}$$

[-0]

A. $(-3, -2)$ excluding -2.5

B. $[0, 1]$ excluding 0.5

C. $(-2, 1)$ excluding 0

D. 0

E. None of these

Q50. If the angles of elevation of the top of a tower from three collinear points A, B and C on a line leading to the foot of the tower are 30° , 45° and 60° respectively, then the ratio AB : BC is

[+1]

A. $\sqrt{3} : 1$

B. $\sqrt{3} : \sqrt{2}$

C. $1 : \sqrt{3}$

D. $2 : 3$

E. None of these

[-0]



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TOTAL QUESTIONS

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ANSWER SHEET — 50 QUESTIONS

Q#	ANS	Q#	ANS	Q#	ANS	Q#	ANS	Q#	ANS
Q01	B	Q11	D	Q21	C	Q31	B	Q41	C
Q02	A	Q12	B	Q22	C	Q32	C	Q42	C
Q03	C	Q13	E	Q23	B	Q33	A	Q43	A
Q04	C	Q14	B	Q24	D	Q34	B	Q44	B
Q05	B	Q15	A	Q25	C	Q35	A	Q45	C
Q06	B	Q16	B	Q26	C	Q36	C	Q46	B
Q07	B	Q17	A	Q27	A	Q37	D	Q47	A
Q08	B	Q18	A	Q28	C	Q38	A	Q48	C
Q09	B	Q19	D	Q29	C	Q39	D	Q49	C
Q10	A	Q20	C	Q30	A	Q40	B	Q50	A

◆ ALL IOF OLYMPIAD PROGRAMMES ◆

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