

This Question Paper contains 8 Printed Pages.

16'O'(A)

MATHEMATICS, Paper - II

(Oriya and English versions)

(Parts A and B)

Time : 2 hrs. 45 min.]

[Maximum Marks : 40

Instructions :

1. Read all questions. 15 minutes of time is allotted exclusively for reading the Question Paper and 2.30 hours for writing the answers.
2. **Part - A** answers should be written in separate answer book.
3. There are **three** sections in **Part-A**.
4. Answer **all** questions.
5. Every answer should be written visibly and clearly.
6. There is internal choice in section - III.

Part - A

Time : 2 hours

Marks : 30

SECTION - I

(Marks : 4×1=4)

- ଦ୍ରଷ୍ଟବ୍ୟ : (i) ସମସ୍ତ ପ୍ରଶ୍ନର ଉତ୍ତର ଲେଖ ।
(ii) ପ୍ରତି ପ୍ରଶ୍ନର ମୂଲ୍ୟାଙ୍କ 1.

1. ΔABC ରେ $LM \parallel BC$ ଏବଂ $\frac{AL}{LB} = \frac{2}{3}$, $AM = 5$ cm; AC ନିରୂପଣ କର ।

2. ମୂଲ୍ୟାୟନ କର $\sin 15^\circ \cdot \sec 75^\circ$.

16'O'(A)
B

[1]

3. ଗୋଟିଏ ପେଡ଼ିରେ 3ଟି ନୀଳ ଓ 4ଟି ନାଲି ବଲ୍ ଅଛି । ଯାଦୂତ୍ୱିକ ଭାବେ କାଡ଼ି ନିଆଯାଇଥିବା ବଲ୍‌ଟି ନାଲି ହେବାର ସମ୍ଭାବ୍ୟତା କେତେ?
4. ଏକ ଗୋଷ୍ଠୀକୃତ ଜାଗାର ମାଧ୍ୟମାନ $\bar{x} = a + \frac{\sum f_i d_i}{\sum f_i}$ ଦ୍ୱାରା ହିସାବ କରାଯାଏ 'f_i' ଓ 'd_i' ପଦଗୁଡ଼ିକ ଉପରୋକ୍ତ ସୂତ୍ରରେ କାହାକୁ ପ୍ରତିନିଧିତ୍ୱ କରନ୍ତି?

SECTION - II

(Marks : 5×2=10)

- ଦ୍ରଷ୍ଟବ୍ୟ : (i) ସମସ୍ତ ପ୍ରଶ୍ନର ଉତ୍ତର ଲେଖ ।
(ii) ପ୍ରତି ପ୍ରଶ୍ନର ମୂଲ୍ୟାଙ୍କ 2.

5. ଦୁଇଟି ବିନ୍ଦୁ (x, 1) ଏବଂ (-1, 5) ମଧ୍ୟରେ ଦୂରତା '5' ହେଲେ 'x' ର ମୂଲ୍ୟ ନିରୂପଣ କର ।

6. 5 cm ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ବୃତ୍ତର କେନ୍ଦ୍ରଠାରୁ 13 cm ଦୂରବର୍ତ୍ତୀ ଏକ ବିନ୍ଦୁରୁ ଅଙ୍କିତ ଡର୍ଶକର ଦୈର୍ଘ୍ୟ ନିରୂପଣ କର ।

7. $\cos A = \frac{7}{25}$ ହେଲେ $\sin A$ ଓ $\operatorname{cosec} A$ ନିରୂପଣ କର । ତୁମେ କ'ଣ ଲକ୍ଷ୍ୟ କଲ ?

8. ଏକ ମନ୍ଦିରର ପାଦ ଦେଶରୁ 24 m. ଦୂରବର୍ତ୍ତୀ ଏକ ବିନ୍ଦୁରୁ ଉତ୍ତମାନ ମନ୍ଦିରର ଦୁର୍ଦ୍ଦାକୁ ଦେଖୁଛି । ଜନତି କୋଣ 30° ହେଲେ ମନ୍ଦିରର ଉଚ୍ଚତା ନିରୂପଣ କର ।

9. ନିମ୍ନ ଆବୃତ୍ତି ବ୍ୟୟନର ମଧ୍ୟ-ମୂଲ୍ୟ ଗୁଡ଼ିକ ନିରୂପଣ କର ।

ଶ୍ରେଣୀ ଅନ୍ତରାଳ	8-11	12-15	16-19	20-23	24-27	28-31	32-35
ଆବୃତ୍ତି	4	4	5	13	20	14	8

SECTION - III

(Marks : 4×4=16)

- ଦ୍ରଷ୍ଟବ୍ୟ : (i) ସମସ୍ତ ପ୍ରଶ୍ନର ଉତ୍ତର ଲେଖ ।
 (ii) ପ୍ରତି ପ୍ରଶ୍ନରୁ ଗୋଟିଏ କାନ୍ଦ ।
 (iii) ପ୍ରତି ପ୍ରଶ୍ନର ମୂଲ୍ୟାଙ୍କ 4 ।

10. (a) ପ୍ରମାଣ କର ଯେ $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$ ।

ଅଥବା

(b) ABC ଏକ ସମକୋଣୀ ତ୍ରିଭୁଜ; C ଏକ ସମକୋଣ । $BC = a$, $CA = b$,
 $AB = c$ ଏବଂ C ରୁ AB ଉପରେ ଲମ୍ବର ଦୈର୍ଘ୍ୟ p ହେଲେ ପ୍ରମାଣ କର ଯେ

(i) $pc = ab$ ଏବଂ (ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$ ।

11. (a) ନିମ୍ନ ତାବାର ମଧ୍ୟମା ନିରୂପଣ କର ।

ଶ୍ରେଣୀ ଅନ୍ତରାଳ	11-15	16-20	21-25	26-30	31-35	36-40
ଆକୃତି	3	5	9	12	7	4

ଅଥବା

(b) $A(-6, 10)$ ଏବଂ $B(3, -8)$ ବିନ୍ଦୁକୁ ଯୋଗ କରୁଥିବା ରେଖା ଖଣ୍ଡକୁ $(-4, 6)$ ବିନ୍ଦୁ କେଉଁ ଅନୁପାତରେ ବିଭକ୍ତ କରେ ?

12. (a) ଗୋଟିଏ ସମୟରେ ଦୁଇଟି ପଶାକାଠି ପିଙ୍ଗା ଗଲା । ପଶାକାଠିର ଅଗ୍ରଭାଗରେ ପରିଦୃଶ୍ୟମାନ ଦୁଇଟି ସଂଖ୍ୟାର ସମଷ୍ଟି (a) 10, (b) 12 ସହ ସମାନ ବା କମ୍, (c) ଗୋଟିଏ ମୌଳିକ ସଂଖ୍ୟା, (d) '3' ର ଏକ ଗୁଣିତକ ହେବାର ସମ୍ଭାବ୍ୟତା କ'ଣ?

ଅଥବା

(b) ବାତ୍ୟାରେ ଲାଙ୍ଗି ଯାଇଥିବା ଏକ ଗଛର ଉଚ୍ଚ ଅଂଶଟି ଏପରି ଲାଙ୍ଗି ଯାଇଛି ଯେ ଗଛର ଅଗ୍ରଭାଗ ଭୂମି ସହ 30° କୋଣ ସୃଷ୍ଟି କରୁଛି । ଭୂମି ଉପରେ ଗଛର ଅଗ୍ରଭାଗ ଓ ପାଦଦେଶର ଦୂରତା 6 m. ହେଲେ ଲାଙ୍ଗି ଯିବା ପୂର୍ବରୁ ଗଛର ଉଚ୍ଚତା ନିରୂପଣ କର ।

13. (a) ଏକ ତ୍ରିଭୁଜ PQR ଅଙ୍କନ କର ଯେପରିକି $QR = 5.5 \text{ cm}$, $\angle Q = 65^\circ$ ଏବଂ $PQ = 6 \text{ cm}$ ଏହା ପରେ ଆଉ ଏକ ତ୍ରିଭୁଜ ଅଙ୍କନ କର ଯାହାର ବାହୁଗୁଡ଼ିକ ΔPQR ର ସମତୁଳ୍ୟ ବାହୁଗୁଡ଼ିକର $\frac{2}{3}$ ହେବ ।

ଅଥବା

- (b) 4 cm ବ୍ୟାସାର୍ଦ୍ଧ ବିଶିଷ୍ଟ ଏକ ବୃତ୍ତ ଅଙ୍କନ କର ଏବଂ କେନ୍ଦ୍ରଠାରୁ 6 cm ଦୂରରେ ପରସ୍ପରକୁ ଛେଦ କରୁଥିବା ବୃତ୍ତ ପ୍ରତି ଦୁଇଟି ସର୍ତ୍ତ ଅଙ୍କନ କର ।

ClassResult.in

16 (A)

MATHEMATICS, Paper - II

(English version)

(Parts A and B)

Time : 2 hrs. 45 min.]

[Maximum Marks : 40

Instructions :

1. Read all questions. 15 minutes of time is allotted exclusively for reading the Question Paper and 2.30 hours for writing the answers.
2. **Part - A** answers should be written in separate answer book.
3. There are **three** sections in **Part-A**.
4. Answer **all** questions.
5. Every answer should be written visibly and clearly.
6. There is internal choice in section - III.

Part - A

Time : 2 hours

Marks : 30

SECTION - I

(Marks : 4×1=4)

- Note :**
- (i) Answer **all** the questions.
 - (ii) Each question carries **1** mark.

1. In $\triangle ABC$, $LM \parallel BC$ and $\frac{AL}{LB} = \frac{2}{3}$, $AM = 5$ cm, find AC .
2. Evaluate $\sin 15^\circ \cdot \sec 75^\circ$.

16 (A)

[5]

B

3. A box contains 3 blue and 4 red balls. What is the probability that the ball taken out randomly will be red ?

4. The mean for a grouped data is calculated by $\bar{x} = a + \frac{\sum f_i d_i}{\sum f_i}$.

What do the terms ' f_i ' and ' d_i ' represent in the above formula ?

SECTION - II

(Marks : 5×2=10)

Note : (i) Answer all questions.

(ii) Each question carries 2 marks.

5. If the distance between two points $(x, 1)$ and $(-1, 5)$ is '5', find the value of ' x '.

6. Find the length of the tangent from a point 13 cm away from the centre of the circle of radius 5 cm.

7. If $\cos A = \frac{7}{25}$, then find $\sin A$ and $\operatorname{cosec} A$.

What do you observe ?

8. Rehman observed the top of a temple at an angle of elevation of 30° , when the observation point is 24 m. away from the foot of the temple. Find the height of the temple.

9. Write mid-values of the following frequency distribution.

Class interval	8-11	12-15	16-19	20-23	24-27	28-31	32-35
Frequency	4	4	5	13	20	14	8

SECTION - III(Marks : $4 \times 4 = 16$)

- Note :** (i) Answer **all** the questions.
(ii) Choose any **one** from each question.
(iii) Each question carries **4** marks.

10. (a) Prove that $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$.

OR

- (b) ABC is a right angled triangle, right angled at C. Let $BC = a$, $CA = b$, $AB = c$ and let p be the length of perpendicular from C on AB.

Prove that (i) $pc = ab$ and (ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.

11. (a) Find the median of the following data.

Class interval	11-15	16-20	21-25	26-30	31-35	36-40
Frequency	3	5	9	12	7	4

OR

- (b) In what ratio, does the point $(-4, 6)$ divide the line segment joining the points $A(-6, 10)$ and $B(3, -8)$?

12. (a) Two dice are thrown at the same time. What is the probability that the sum of two numbers appearing on the top of the dice is (a) 10, (b) less than or equal to 12, (c) a prime number, (d) multiple of '3'?

OR

- (b) A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground by making 30° angle with the ground. The distance between the foot of the tree and the top of the tree on the ground is 6 m. Find the height of the tree before falling down.

13. (a) Construct a triangle PQR, where $QR = 5.5$ cm, $\angle Q = 65^\circ$ and $PQ = 6$ cm. Then draw another triangle, whose sides are $\frac{2}{3}$ times of the corresponding sides of ΔPQR .

OR

- (b) Draw a circle of radius 4 cm and draw a pair of tangents to the circle, which are intersecting each other 6 cm away from the centre.
-

ClassResult.in

This Question Paper contains 8 Printed Pages.

16'O'(B)

MATHEMATICS, Paper - II

(Oriya and English versions)

(Parts A and B)

Time : 2 hrs. 45 min.]

[Maximum Marks : 40

Instruction : Write the answers to the questions in this **Part-B** on the Question paper itself and attach it to the answer book of **Part-A**.

Part - B

Time : 30 minutes

Marks : 10

SECTION - IV

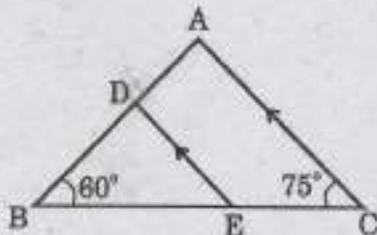
(Marks : $20 \times \frac{1}{2} = 10$)

Note :

- (i) Answer **all** the questions.
- (ii) Each question carries $\frac{1}{2}$ mark.
- (iii) Marks will **not** be awarded in any case of over-written, rewritten or erased answers.
- (iv) Each question has four options. Write the **CAPITAL LETTERS** (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.

14. ଚିତ୍ରରେ $\angle BDE = \dots$

[]



(A) 45°

(B) 65°

(C) 75°

(D) 60°

16'O'(B)

[1]

15. $\cos 60^\circ + \sin 30^\circ$ ର ମୂଲ୍ୟ []

- (A) $\frac{\sqrt{3}}{2}$ (B) 1
(C) $\cos 90^\circ$ (D) B ଓ C

16. ଦୁଇଟି ଓଜିଭର ଛେଦ ବିନ୍ଦୁର X-ସ୍ଥାନାଙ୍କ ର ପ୍ରତିନିଧିତ୍ୱ କରେ । []

- (A) ମାଧ୍ୟମାନ (B) ମଧ୍ୟମା
(C) ବ୍ୟାପ୍ତି (D) ଗରିଷ୍ଠକ

17. ଶିର୍ଷ ବିନ୍ଦୁ $(-a, 0)$, $(0, b)$ ଓ $(a, 0)$ ଥିବା ତ୍ରିଭୁଜର ଭର କେନ୍ଦ୍ର []

- (A) (a, b) (B) $(\frac{a}{3}, 0)$
(C) $(0, \frac{b}{3})$ (D) $(\frac{a}{3}, \frac{b}{3})$

18. ତ୍ରିଭୁଜର କ୍ଷେତ୍ରଫଳ ନିରୂପଣର ସୂତ୍ର []

- (A) $\Delta = \frac{1}{2}bh$ (B) $\Delta = \sqrt{(s-a)(s-b)(s-c)}$
(C) $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$ (D) A ଓ C

19. ପ୍ରକର ଅନୁପାତରେ ରେଖା ଖଣ୍ଡର ବିଭାଜନ ପାଇଁ କାର୍ଯ୍ୟକାରୀ ହେଉଥିବା ଉପପାଦ୍ୟ []

- (A) ପାଇଥାଗୋର ଉପପାଦ୍ୟ (B) ଥାଲସ୍ ଉପପାଦ୍ୟ
(C) ଭଜକ୍ୱିଟ୍ ଉପପାଦ୍ୟ (D) ବ୍ରହ୍ମଗୁପ୍ତ ଉପପାଦ୍ୟ

20. ବ୍ୟାସର ଅନ୍ତ୍ୟ ବିନ୍ଦୁମାନଙ୍କରୁ ଅଙ୍କା ଯାଇପାରୁଥିବା ସର୍ବାଧିକ ସଂଖ୍ୟା []

- (A) 1 (B) 2
(C) 3 (D) ଅନନ୍ତ

21. $\sec A + \tan A = \frac{1}{5}$ ହେଲେ $\sec A - \tan A = \dots$ []

- (A) 5 (B) $\frac{1}{5}$
(C) $\frac{4}{5}$ (D) $\frac{2}{5}$

16'O'(B)
B

[2]

22. ଏକ ପ୍ରମ ଓ ତା'ର ଛାୟାର ଦୈର୍ଘ୍ୟ ସମାନ ହେଲେ ସୂର୍ଯ୍ୟକର ଉଚ୍ଚତା କୋଣ []
- (A) 15° (B) 30°
(C) 45° (D) 60°
23. ଏକ ଅର୍ଦ୍ଧ-ବୃତ୍ତରେ କୋଣ []
- (A) 60° (B) 90°
(C) 180° (D) 270°
24. ଦୁଇଟି ପଶାକାଠି ଏକା ଥରେ ଫିଟା ଗଲେ ପଶାକାଠିର ଅଗ୍ରଭାଗରେ ପରିଦୃଶ୍ୟମାନ ଦୁଇ ସଂଖ୍ୟାର ସମଷ୍ଟି 13 ହେବାର ସମ୍ଭାବ୍ୟତା []
- (A) -1 (B) 1
(C) 0 (D) 2
25. $P(E) = 0.05$ ହେଲେ $P(\bar{E}) = \dots$ []
- (A) 0.5 (B) 0.95
(C) 9.5 (D) 0.095
26. ତାଳା 5, 6, 9, 10, 6, 11, 4, 6, 10, 4 ର ଗଠିତ୍ଵକ []
- (A) 4 (B) 5
(C) 6 (D) 10
27. $\tan \theta$ ର ହିସାବଦ୍ରୁମା ... []
- (A) $\sec \theta$ (B) $\cot \theta$
(C) $\operatorname{cosec} \theta$ (D) $-\tan \theta$
28. $(\sec^2 \theta - 1)(\operatorname{cosec}^2 \theta - 1) = \dots$ []
- (A) 0 (B) 1
(C) $\tan^2 \theta$ (D) $\cot^2 \theta$

29. ବୃତ୍ତର କେନ୍ଦ୍ର $(2, 1)$ ଏବଂ ବ୍ୟାସର ଗୋଟିଏ ଅନ୍ତ୍ୟ ବିନ୍ଦୁ $(3, -4)$ ହେଲେ ବ୍ୟାସର ଅନ୍ୟ ଅନ୍ତ୍ୟ ବିନ୍ଦୁ

[1]

(A) $(1, 6)$

(B) $(-1, -6)$

(C) $(1, -6)$

(D) $(-1, 6)$

30. $\frac{x_i - a}{h}$ କୁ ପ୍ରତିନିଧିତ୍ୱ କରୁଥିବା କେଉଁ ଅକ୍ଷର ମାଧ୍ୟମାନର ପରିମାପ ପାଇଁ ବ୍ୟବହୃତ ହୁଏ ?

[1]

(A) d_i

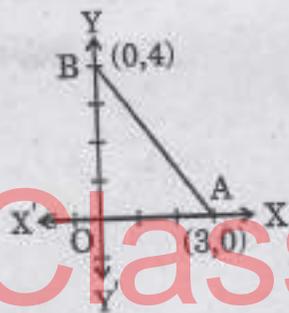
(B) f_i

(C) u_i

(D) \bar{x}

31. ପ୍ରଦତ୍ତ ଚିତ୍ରରେ ΔOAB ର କ୍ଷେତ୍ରଫଳ

[1]



(A) 12 ବର୍ଗ ଏକକ

(B) 6 ବର୍ଗ ଏକକ

(C) 24 ବର୍ଗ ଏକକ

(D) 18 ବର୍ଗ ଏକକ

32. ନିମ୍ନ ମଧ୍ୟରୁ କେଉଁଟି ଏକ ଉତ୍ତରୀୟ ସମ୍ଭାବ୍ୟତା ?

[1]

(A) -1.5

(B) 2.4

(C) 0.7

(D) 115%

33. $\sin(90 - A) = \frac{1}{2}$ ହେଲେ $A = \dots$

[1]

(A) 30°

(B) 45°

(C) 60°

(D) 90°

MATHEMATICS, Paper - II

(English version)

(Parts A and B)

Time : 2 hrs. 45 min.]

[Maximum Marks : 40

Instruction : Write the answers to the questions in this **Part-B** on the Question paper itself and attach it to the answer book of **Part-A**.

Part - B

Time : 30 minutes

Marks : 10

SECTION - IV

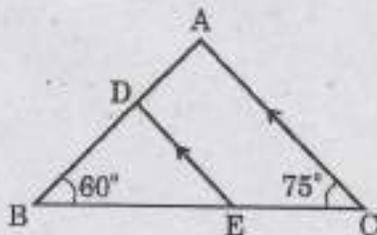
(Marks : $20 \times \frac{1}{2} = 10$)

Note :

- (i) Answer **all** the questions.
- (ii) Each question carries $\frac{1}{2}$ mark.
- (iii) Marks will **not** be awarded in any case of over-written, rewritten or erased answers.
- (iv) Each question has four options. Write the **CAPITAL LETTERS** (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.

14. In the figure, $\angle BDE = \dots$

[]



(A) 45°

(B) 65°

(C) 75°

(D) 60°

16 (B)

[5]

B

15. $\cos 60^\circ + \sin 30^\circ$ value is []
(A) $\frac{\sqrt{3}}{2}$ (B) 1
(C) $\cos 90^\circ$ (D) B and C
16. X-coordinate of intersecting point of two ogives, represents []
(A) Mean (B) Median
(C) Range (D) Mode
17. Centroid of a triangle, whose vertices are $(-a, 0)$, $(0, b)$ and $(a, 0)$ is ... []
(A) (a, b) (B) $(\frac{a}{3}, 0)$
(C) $(0, \frac{b}{3})$ (D) $(\frac{a}{3}, \frac{b}{3})$
18. The formula to find the area of a triangle is []
(A) $\Delta = \frac{1}{2}bh$ (B) $\Delta = \sqrt{(s-a)(s-b)(s-c)}$
(C) $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$ (D) A and C
19. The theorem applied to divide the line segment in the given ratio is []
(A) Pythagorus theorem (B) Thales theorem
(C) Euclid's theorem (D) Brahmagupta theorem
20. The number of tangents drawn at the end points of the diameter is []
(A) 1 (B) 2
(C) 3 (D) Infinite
21. If $\sec A + \tan A = \frac{1}{5}$, then $\sec A - \tan A = \dots$ []
(A) 5 (B) $\frac{1}{5}$
(C) $\frac{4}{5}$ (D) $\frac{2}{5}$

22. The length of shadow of a pole is equal to the length of the pole, then the angle of the elevation of the Sun is []
(A) 15° (B) 30°
(C) 45° (D) 60°
23. Angle in a semi-circle is ... []
(A) 60° (B) 90°
(C) 180° (D) 270°
24. The probability that the sum of two numbers appearing on the top of the dice is 13, when two dice are rolled at the same time is []
(A) -1 (B) 1
(C) 0 (D) 2
25. If $P(E) = 0.05$, then $P(\bar{E}) = \dots$ []
(A) 0.5 (B) 0.95
(C) 9.5 (D) 0.095
26. The mode of the data 5, 6, 9, 10, 6, 11, 4, 6, 10, 4 is []
(A) 4 (B) 5
(C) 6 (D) 10
27. Reciprocal of $\tan \theta$ is ... []
(A) $\sec \theta$ (B) $\cot \theta$
(C) $\operatorname{cosec} \theta$ (D) $-\tan \theta$
28. $(\sec^2 \theta - 1)(\operatorname{cosec}^2 \theta - 1) = \dots$ []
(A) 0 (B) 1
(C) $\tan^2 \theta$ (D) $\cot^2 \theta$

