

**D**

DE-2912
B. Sc. (Sem. I) Examination
March / April – 2016
Mathematics : MTH-101
(Trigonometry)

Time : 2 Hours]

[Total Marks : 50

સૂચના / Instructions :

(૧)

<p>નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : B. Sc. (SEM. 1)</p> <p>Name of the Subject : MATHEMATICS - MTH-101</p> <p>Subject Code No. : 2 9 1 2 Section No. (1, 2,...): Nil</p>	<p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; margin-top: 10px;">Student's Signature</div>
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- (૨) આ પ્રશ્નપત્રમાં કુલ ચાર વિભાગો A, B, C અને D થઈને 18 પ્રશ્નો છે.
- (2) There are four sections in the question paper A, B, C and D having total 18 questions.
- (૩) દરેક પ્રશ્નને ફક્ત એક જ સાચો ઉત્તર છે.
- (3) There is only one correct answer for each question.
- (૪) પ્રચલિત સંકેતોને અનુસરો
- (4) Follow usual symbols.

SECTION - A : Q. 1 to 4 Multiple choice questions : (1 mark)
SECTION - B : Q. 5 to 8 Multiple Choice Questions : (2 marks)
SECTION - C : Q. 9 to 14 Multiple choice questions : (3 mark)
SECTION - D : Q. 15 to 18 Multiple Choice Questions : (5 marks)

***O.M.R. Sheet ભરવા અંગેની અગત્યની સૂચનાઓ આપેલ
O.M.R. Sheet-ની પાછળ છાપેલ છે.***

***Important instructions to fillup O.M.R. Sheet
are given back side of provided O.M.R. Sheet.***

- 1 $\text{Log}(i) = \underline{\hspace{2cm}}$.
- (A) $\left(2n + \frac{1}{2}\right)\pi i$
- (B) $\left(n + \frac{1}{2}\right)\pi i$
- (C) $\left(2n + \frac{1}{4}\right)\pi i$
- (D) $(2n+1)\frac{\pi}{2}i$
- 2 જો $x + \frac{1}{x} = 2 \cos 2\theta$ હોય, તો $x = \underline{\hspace{2cm}}$.
- If $x + \frac{1}{x} = 2 \cos 2\theta$, then $x = \underline{\hspace{2cm}}$.
- (A) $\sin 2\theta + i \cos 2\theta$
- (B) $\cos 2\theta + i \sin 2\theta$
- (C) $-\cos 2\theta + i \sin 2\theta$
- (D) $-\cos 2\theta - i \sin 2\theta$
- 3 $\tan \alpha = \underline{\hspace{2cm}}$. (α રેડિયનમાં છે.)
- $\tan \alpha = \underline{\hspace{2cm}}$. (where α is in radian)
- (A) $\alpha + \frac{\alpha^3}{3} + \frac{1}{15}\alpha^5 + \dots$
- (B) $\alpha + \frac{\alpha^3}{3!} + \frac{2}{5!}\alpha^5 + \dots$
- (C) $\alpha - \frac{\alpha^3}{3} + \frac{2}{15}\alpha^5 - \dots$
- (D) $\alpha + \frac{\alpha^3}{3} + \frac{2}{15}\alpha^5 + \dots$
- 4 $e^{-i\theta} = \underline{\hspace{2cm}}$.
- (A) $\cos \theta + i \sin \theta$
- (B) $\sin \theta - i \cos \theta$
- (C) $\cos \theta - i \sin \theta$
- (D) $-\cos \theta - i \sin \theta$

5 $i^i =$ _____

(A) $e^{-\left(2n\pi + \frac{\pi}{2}\right)}$

(B) $e^{-\left(2n\pi - \frac{\pi}{2}\right)}$

(C) $e^{\left(2n\pi - \frac{\pi}{2}\right)}$

(D) $e^{\left(2n\pi + \frac{\pi}{2}\right)}$

6 $\frac{\left(\cos \frac{\pi}{3} - i \sin \frac{\pi}{3}\right)^{5/2}}{\left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}\right)^{1/2}} =$ _____

(A) $\frac{1}{2}$

(B) 0

(C) -1

(D) 1

7 $\operatorname{cosech}^{-1} \frac{1}{2x\sqrt{1+x^2}} = \underline{\hspace{2cm}}$.

(A) $\sinh^{-1} 2x$

(B) $2\sinh^{-1} x$

(C) $2\operatorname{sech}^{-1} x$

(D) $2\cosh^{-1} x$

8 $2\sin^2(\alpha - i\beta)$ નો કાલ્પનિક ભાગ $\underline{\hspace{2cm}}$ છે.

Imaginary part of $2\sin^2(\alpha - i\beta)$ is $\underline{\hspace{2cm}}$.

(A) $\sin 2\alpha \sinh 2\beta$

(B) $-\sinh 2\alpha \sin 2\beta$

(C) $\sinh 2\alpha \sin 2\beta$

(D) $-\sin 2\alpha \sinh 2\beta$

9 જો $\sin(u+iv) = x+iy$ હોય, તો $\frac{x^2}{\sin^2 u} - \frac{y^2}{\cos^2 u} = \underline{\hspace{2cm}}$.

If $\sin(u+iv) = x+iy$, then $\frac{x^2}{\sin^2 u} - \frac{y^2}{\cos^2 u} = \underline{\hspace{2cm}}$.

(A) 1

(B) 2

(C) -1

(D) 0

10 $\log \frac{a+ib}{a-ib} = \underline{\hspace{2cm}}$.

(A) $i \tan^{-1} \frac{a}{b}$

(B) $i \tan^{-1} \frac{b}{a}$

(C) $2i \tan^{-1} \frac{b}{a}$

(D) $2i \tan^{-1} \frac{a}{b}$

11 $\tan 7\theta$ નું $\tan \theta$ ની પદાવલિમાં વિસ્તરણ $\underline{\hspace{2cm}}$ છે.

Expansion of $\tan 7\theta$ in terms of $\tan \theta$ is $\underline{\hspace{2cm}}$.

(A) $\frac{7\tan\theta - 35\tan^3\theta - 21\tan^5\theta - \tan^7\theta}{1 - 21\tan^2\theta - 35\tan^4\theta - 7\tan^6\theta}$

(B) $\frac{7\tan\theta - 35\tan^3\theta + 21\tan^5\theta - \tan^7\theta}{1 + 21\tan^2\theta - 35\tan^4\theta + 7\tan^6\theta}$

(C) $\frac{7\tan\theta - 35\tan^3\theta + 21\tan^5\theta - \tan^7\theta}{1 - 21\tan^2\theta + 35\tan^4\theta - 7\tan^6\theta}$

(D) $\frac{7\tan\theta + 35\tan^3\theta - 21\tan^5\theta + \tan^7\theta}{1 - 21\tan^2\theta + 35\tan^4\theta - 7\tan^6\theta}$

12 $\lim_{x \rightarrow 0} \left(\frac{\tan x}{x} \right)^{1/x} = \underline{\hspace{2cm}} .$

- (A) e
- (B) -1
- (C) e^{-1}
- (D) 1

13 $\frac{\cosh A - \cosh 3A}{\cosh 4A - \cosh 6A} = \underline{\hspace{2cm}} .$

- (A) $\frac{\sinh 5A + \sinh A}{\sinh 8A - \sinh 2A}$
- (B) $\frac{\sinh 5A - \sinh A}{\sinh 8A + \sinh 2A}$
- (C) $\frac{\sinh 5A + \sinh A}{\sinh 8A + \sinh 2A}$
- (D) $\frac{\sinh 5A - \sinh A}{\sinh 8A - \sinh 2A}$

14 $\left\{ \sin(\alpha + \beta) - e^{\alpha i} \sin \beta \right\}^n = \underline{\hspace{2cm}} .$

- (A) $\sin^n \alpha \cdot e^{n\beta i}$
- (B) $\sin n\alpha \cdot e^{-n\beta i}$
- (C) $\sin \alpha \cdot e^{-n\beta i}$
- (D) $\sin^n \alpha \cdot e^{-n\beta i}$

15 $\log \cos(x+iy)$ નો કાલ્પનિક ભાગ _____ છે.

Imaginary part of $\log \cos(x+iy)$ is _____.

(A) $-\tan^{-1}(\tanh x \tan y)$

(B) $-\tan^{-1}(\tan x \tanh y)$

(C) $\tan^{-1}(\tanh x \tan y)$

(D) $\tan^{-1}(\tan x \tanh y)$

16 $\{(\cos \theta + \cos \phi) + i(\sin \theta + \sin \phi)\}^n + \{(\cos \theta + \cos \phi) - i(\sin \theta + \sin \phi)\}^n = \underline{\hspace{2cm}}$

(A) $2^{n+1} \cos^n \frac{\phi + \theta}{2} \cdot \cos n \left(\frac{\phi + \theta}{2} \right)$

(B) $2^{n+1} \cos^n \frac{\phi - \theta}{2} \cdot \cos n \left(\frac{\phi + \theta}{2} \right)$

(C) $2^{n+1} \cos^n \frac{\phi + \theta}{2} \cdot \cos n \left(\frac{\theta - \phi}{2} \right)$

(D) $2^{n+1} \cos^n \frac{\theta - \phi}{2} \cdot \cos n \left(\frac{\phi + \theta}{2} \right)$

17 $\sinh^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right) = \text{_____} .$

(A) $\tanh^{-1} x$

(B) $\operatorname{cosec} h^{-1} x$

(C) $\cosh^{-1} x$

(D) $\tan^{-1} x$

18 જો $\tanh(u+iv) = \sin(x+iy)$ હોય, તો $\sin h2u \cdot \operatorname{cosec} 2v = \text{_____}$

If $\tanh(u+iv) = \sin(x+iy)$, then $\sin h2u \cdot \operatorname{cosec} 2v = \text{_____} .$

(A) $\tan x \cot y$

(B) $\tanh x \cot y$

(C) $\tan x \coth y$

(D) $\tanh x \coth y$