# **Model Question Paper**

## **Mathematics (MTH2)**

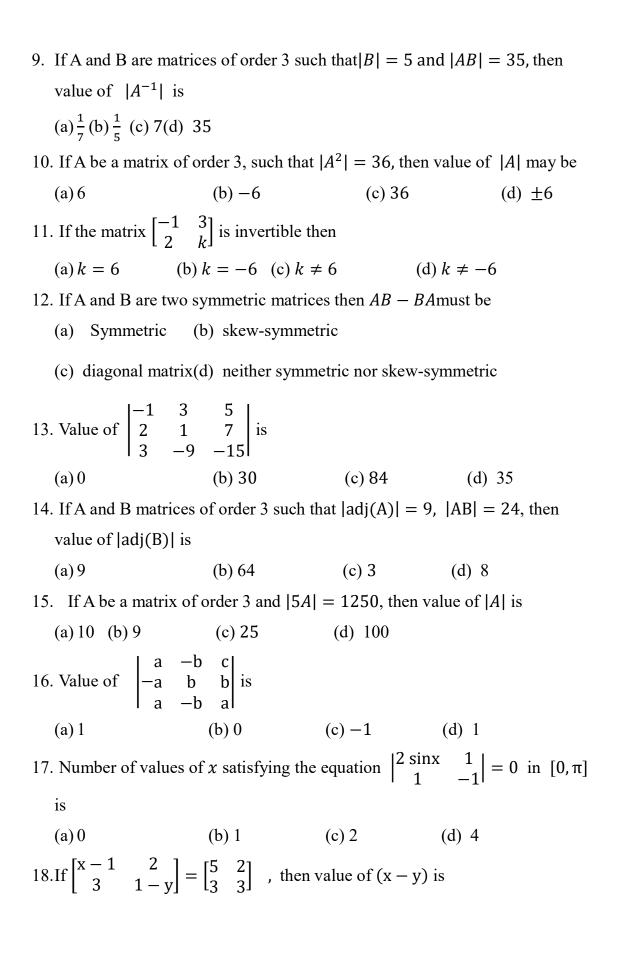
### Class - XII

### **Semester – III**

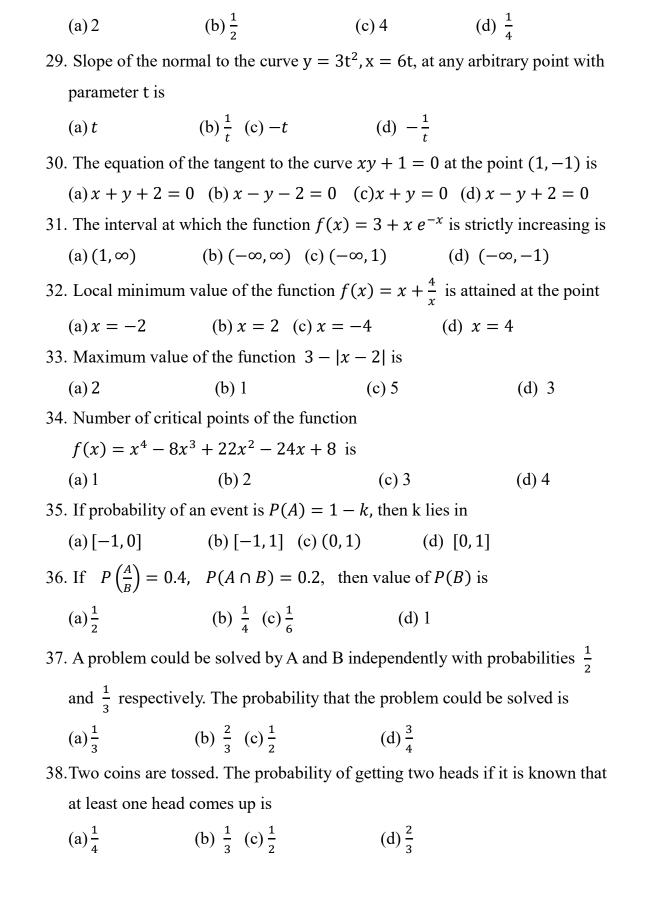
#### Full Marks: 40

Answer the following questions (MCQ Type) carrying 1 mark each.

Cł	noose the correct opti	ion (single option co	$rrect) (40 \times 1 = 4$	<b>(0</b> )
1.	1. Principal value of $\cot^{-1}(-\sqrt{3})$ is			
	(a) $-\frac{\pi}{6}$ (b) $\frac{5\pi}{6}$ (c) $-\frac{5\pi}{6}$	$\frac{\pi}{6} \qquad (d)\frac{7\pi}{6}$		
2.	Domain of $f(x) = \sin(x)$	$n^{-1}(2-x)$ is		
	(a) $[1, 3]$	(b) (1,3) (c) [0,3]	[d]	-1]
3.	Value of $\cos^{-1} (\cos ($	f cos <sup>-1</sup> $\left(\cos\left(\frac{5\pi}{4}\right)\right)$ is (b) $-\frac{\pi}{4}$ (c) $\frac{3\pi}{4}$ (d) $-\frac{3\pi}{4}$		
	$(a)\frac{\pi}{4}$	(b) $-\frac{\pi}{4}$ (c) $\frac{3\pi}{4}$ (d)	$-\frac{3\pi}{4}$	
4. Value of $\tan^{-1} 1 + \tan^{-2} 2 + \tan^{-1} 3$ is				
	(a) 0	$(b)\frac{3\pi}{2}$	(c) π	$(d)\frac{3\pi}{4}$
5.	Value of x satisfying	the equation $\sin^{-1} x$	$+\cos^{-1}(1-x) = \frac{\pi}{2}$	$\frac{\pi}{2}$ is
	(a) 0	(b) 1	(c) 2	(d) $\frac{1}{2}$
6.	Let A be a matrix of o	order $4 \times m$ and B be	a matrix of order 3	$\times$ <i>n</i> , such that
	AB and BA are defin	ed. Then value of (m	+ n) is	
	(a) 4	(b) 6	(c) 7	(d) 8
7.	If A be a matrix of or	$der 3 \times 3, with  A  =$	4, then value of $ a $	dj(A) is
	(a) 9	(b) 16	(c) 27	(d) 64
8.	If A be a matrix $A =$	$[a_{ij}]$ <sub>2×3</sub> such that $a_{ij}$	$a_{ij} = (-1)^{i+j}$ , then	value of $a_{23}$
	is			
	(a) 0	(b) 1	(c) $-1$	(d) 2



(a) 4	(b) -4	(c) - 8	(d) 8		
19. Number of points of discontinuity of the function $f(x) = \frac{1}{2-x^2}$ is					
(a) 0	(b) 1	(c) 2	(d) infinite		
20. If $f(x) = 3x - $	+ 5, $x < 2$ ,				
$=x-3k$ , $x \ge$	≥ 2, is continuous	at $x = 2$ , then value	$e  ext{ of } k  ext{ is}$		
(a) 3	(b) -3	(c) 6	(d) -6		
21. The function $f($	f(x) =  x  is not dif	ferentiable at			
(a) x = 1	(b) $x = -1$ (c)	x = 2 (d)	x = 0		
$22.\text{If } f(x) = \log(x)$	$+\sqrt{x^2+1}$ ), then	f'(1) is equal to			
(a) $\frac{1}{2}$	(b) $1 + \frac{1}{\sqrt{2}}$ (c)	$\frac{1}{\sqrt{2}}$ (d)	$\sqrt{2}$		
	·	•			
23. If $x = 2t^2$ and	$y = 4t$ , then $\left[\frac{dy}{dx}\right]$	t=3is			
$(a)\frac{1}{3}$	(b) 3	(c) 1	(d) $\frac{1}{2}$		
24. If $x^2  cdot y^3 = (x + y)^5$ , then value of $\frac{d^2y}{dx^2}$ is					
$(a)\frac{y}{x}$	(b) $\frac{x}{y}$ (c) 1	(d) 0			
25. If y = a logx + b satisfies $f(x) \frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$ , then value of f'(2) is					
(a) 2	(b) -2	(c) 1	(d) -1		
26. Derivative of $\cos^{-1}(1 - 2x^2)$ w.r.t $\sin^{-1} x$ , $0 \le x \le \frac{1}{2}$ , is					
(a) 2	(b) -2	(c) $\frac{1}{2}$	(d) $-\frac{1}{2}$		
27. The point on the	e graph of the func	$tion 6y = 3x^2 + 9$	, where rate of change		
of abscissa and o	ordinate are same i	s			
(a) (2, 1)	(b) $(-2,1)$	(c)(1,2)	(d) $(-1,2)$		
28. If V and S are v	olume and surface	area of a sphere su	ch that $\frac{dV}{dt} = \frac{dS}{dt}$ , then		
its radius is equa			ut ut		
<b>1</b>					



39. A speaks truth in 60% cases and B speaks truth in 70% cases. The				
probability that they will say the same thing while describing a single even				Ĺ
1S				
(a) 0.56	(b) 0.54	(c) $0.38$	(d) 0.94	
10 A hag contains 5 white and 6 black halls. Another hag R contains 1 white				

- 40. A bag contains 5 white and 6 black balls. Another bag B contains 4 white and 3 black balls. A ball is transferred from bag A to the bag B and then a ball is taken out from the second bag. The probability of this ball being black is
  - (a)  $\frac{35}{88}$  (b)  $\frac{37}{88}$
- (c)  $\frac{39}{88}$  (d)  $\frac{39}{89}$

\*\*\* END \*\*\*

## **Answer Key to Model Question Paper**

#### **Mathematics (MTH2)**

Class - XII

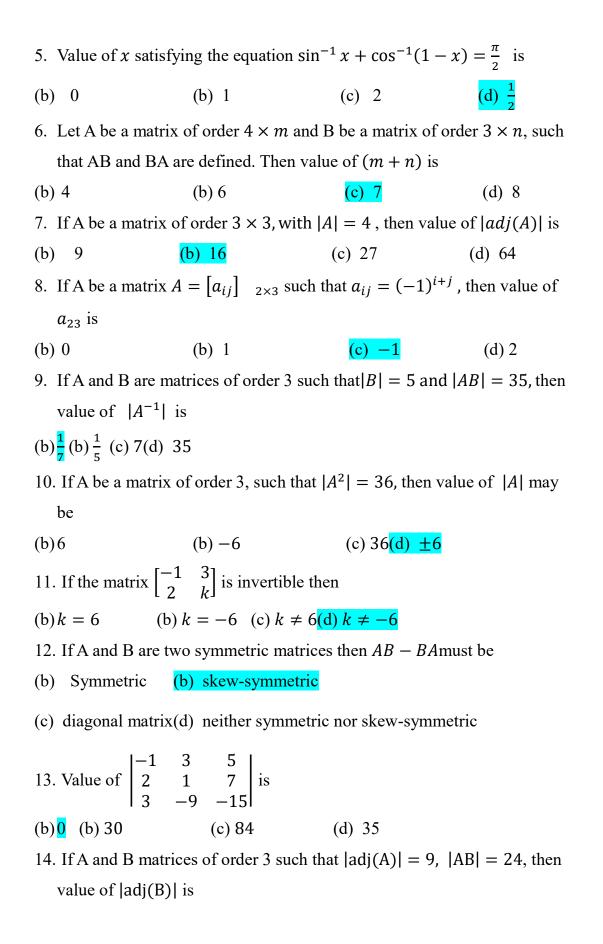
Semester – III

Answer the following questions (MCQ Type) carrying 1 mark each.

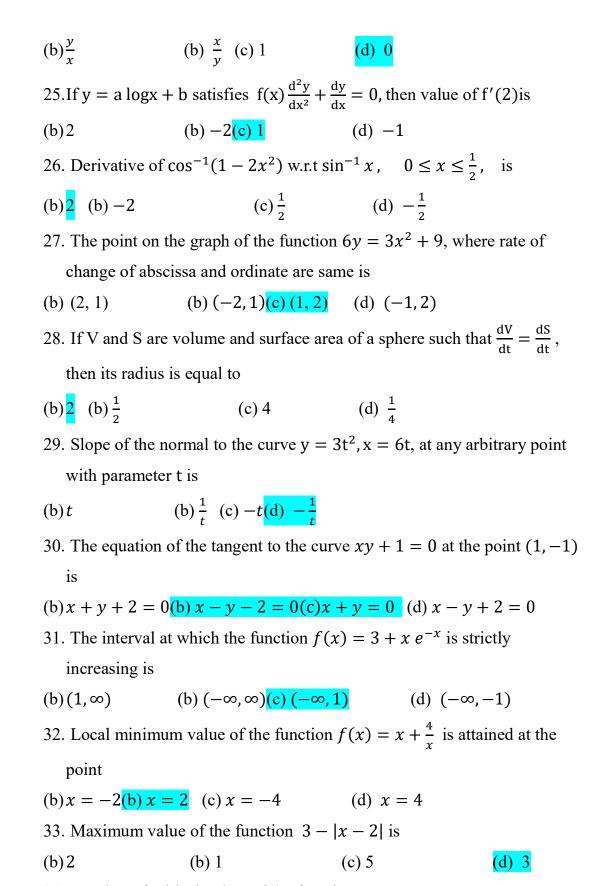
Choose the correct option (single option correct)  $(40 \times 1 = 40)$ 

- 1. Principal value of  $\cot^{-1}(-\sqrt{3})$  is
- (b)  $-\frac{\pi}{6}$  (b)  $\frac{5\pi}{6}$  (c)  $-\frac{5\pi}{6}$  (d)  $\frac{7\pi}{6}$
- 2. Domain of  $f(x) = \sin^{-1}(2 x)$  is
- (b)[1,3]
- (b) (1,3) (c) [0,3] (d) [-3,-1]
- 3. Value of  $\cos^{-1}\left(\cos\left(\frac{5\pi}{4}\right)\right)$  is
- $(b)^{\frac{\pi}{4}}$

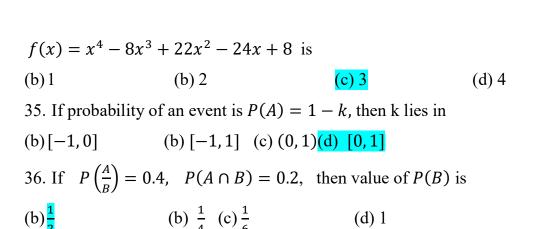
- (b)  $-\frac{\pi}{4}$  (c)  $\frac{3\pi}{4}$  (d)  $-\frac{3\pi}{4}$
- 4. Value of  $\tan^{-1} 1 + \tan^{-2} 2 + \tan^{-1} 3$  is
- (b) 0
- (b)  $\frac{3\pi}{2}$  (c)  $\pi$
- $(d)\frac{3\pi}{4}$



(b)9	(b) 64	(c) 3	(d) 8
15. If A be	a matrix of order 3 ar	5A  = 1250	, then value of $ A $ is
(b) 10 (b) 9	(c) 25	(d) 100	
16. Value of	$\begin{vmatrix} a & -b & c \\ -a & b & b \\ a & -b & a \end{vmatrix}$ is		
(b) 1	(b) 0	(c) -1	(d) 1
17. Number	of values of $x$ satisfy	ving the equation	$\begin{vmatrix} 2\sin x & 1 \\ 1 & -1 \end{vmatrix} = 0 \text{ in}$
$[0,\pi]$ is			
(b) 0 (b) 1	(c) 2	(d) 4	
$18.If \begin{bmatrix} x-1 \\ 3 \end{bmatrix}$	$\begin{bmatrix} 2 \\ 1 - y \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ 3 & 3 \end{bmatrix}$	, then value of	(x - y) is
(b)4	(b) -4	$(c) - 8 \frac{(c)}{(c)}$	8
19. Number	of points of discontin	nuity of the func	tion $f(x) = \frac{1}{2-x^2}$ is
(b)0	(b) 1	(c) 2	(d) infinite
20. If $f(x)$	= 3x + 5, x < 2,		
=x-3k,	$x \ge 2$ , is continuou	s at $x = 2$ , then	value of k is
(b)3	(b) $-3$	(c) 6	(d) -6
21. The func	tion f(x) =  x  is note.	ot differentiable	at
(b) $x = 1$	(b) $x = -1$ (	(c) $x = 2(d) x =$	<mark>= 0</mark>
$22.\mathrm{If}f(x) =$	$\log(x+\sqrt{x^2+1}),$	then $f'(1)$ is eq	ual to
$(b)^{\frac{1}{2}}$	(b) $1 + \frac{1}{\sqrt{2}}$ (c)	$\frac{1}{\sqrt{2}}$ (	d) $\sqrt{2}$
	,	·d.v1	
23. If $x = 2t$	$z^2$ and $y = 4t$ , then	$\left[\frac{dy}{dx}\right]$ $t=3$ is	
$(b)^{\frac{1}{3}}$	(b) 3	(c) 1	(d) $\frac{1}{2}$
24. If $x^2  ext{.} y^3$	$=(x+y)^5$ , then va	alue of $\frac{d^2y}{dx^2}$ is	



34. Number of critical points of the function



37. A problem could be solved by A and B independently with probabilities  $\frac{1}{2}$  and  $\frac{1}{3}$  respectively. The probability that the problem could be solved is

(b)  $\frac{1}{3}$  (c)  $\frac{1}{2}$  (d)  $\frac{3}{4}$ 

38. Two coins are tossed. The probability of getting two heads if it is known that at least one head comes up is

 $(b)\frac{1}{4}(b)\frac{1}{3}(c)\frac{1}{2}(d)\frac{2}{3}$ 

39.A speaks truth in 60% cases and B speaks truth in 70% cases. The probability that they will say the same thing while describing a single event is

(b) 0.56 (b) 0.54 (c) 0.38 (d) 0.94

40. A bag contains 5 white and 6 black balls. Another bag B contains 4 white and 3 black balls. A ball is transferred from bag A to the bag B and then a ball is taken out from the second bag. The probability of this ball being black is

(a)  $\frac{35}{88}$  (b)  $\frac{37}{88}$  (c)  $\frac{39}{88}$  (d)  $\frac{39}{89}$ 

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