INSTITUTE NAME AND LOGO

MHT-CET 2017

Maths : Matrices

Question Booklet Version	Roll No.	Question Booklet Sr. No.
44		**674402**
(Write this number on your Answer Sheet)	**Answer Sheet No.**	(Write this number on your Answer Sheet)

Duration: 90 Minutes Total Marks: 100

This is to certify that, the entries of MHT-CET Roll No. and Answer Sheet No. have been correctly written and verified.

Candidate's Signature **Invigilator's Signature**

Instructions To Candidate

1. This question booklet contains 50 Objective Type Ques. in the subject of Mathematics(50).
2. The question papers and OMR (Optical Mark Reader) Answer Sheets are issued separately at the start of the examination
3. Choice and sequence for attempting questions will be as per the convenience of the candidate
4. Candidate should carefully read the instructions printed on the Question Booklet and Answer Sheet and make the correct entries on the Answer Sheet. As Answer Sheets are designed to suit the OPTICAL MARK READER (OMR) SYSTEM, special care should be taken to mark the entries correctly. Special care should be taken to fill QUESTION BOOKLET VERSION, SERIAL No. and MHT-CET Roll No. accurately. The correctness of entries has to be cross-checked by the invigilators. The candidate must sign on the Answer Sheet and Question Booklet
5. Read each question carefully.
6. Determine the correct answer from out of the four available options given for each question.
7. Fill the appropriate circle completely like this ●, for answering a particular question. Mark with Black ink ball point pen only.
8. Each answer with correct response shall be awarded two (2) mark for Mathematics. **There is no Negative Marking. No mark shall be awarded for marking two or more answers of same question, scratching or overwriting.**
9. **Use of whitener or any other material to erase/hide the circle once filled is not permitted.**
10. Avoid overwriting and/or striking of answer once marked.
11. Rough work should be done only on the blank space provided on the Question Booklet. Rough work should not be done on the Answer Sheet.
12. The required mathematical tables (Log etc.) will be provided along with the question booklet.
13. Immediately after the prescribed examination time is over, the Question Booklet and Answer sheet is to be returned to the invigilator. Confirm that both the candidate and invigilator have signed on question booklet and Answer sheet.
14. No candidate is allowed to leave the examination hall till the Paper gets over.

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MHT-CET 2017

Time : 90 Min	**Maths : Matrices**	**Marks : 100**

201) The inverse of matrix $A=\begin{bmatrix}0&1&2\\1&2&3\\3&1&1\end{bmatrix}$ is

A) $\begin{bmatrix}\frac{1}{2}&-4&\frac{5}{2}\\1&-6&3\\1&2&-1\end{bmatrix}$ B) $\begin{bmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\-4&3&-1\\\frac{5}{2}&\frac{-3}{2}&\frac{1}{2}\end{bmatrix}$

C) $\frac{1}{2}\begin{bmatrix}1&2&3\\3&2&1\\4&2&3\end{bmatrix}$ D) $\frac{1}{2}\begin{bmatrix}1&-1&-1\\-8&6&-2\\5&-3&1\end{bmatrix}$

202) The inverse of the matrix $\begin{bmatrix}3&-2\\1&4\end{bmatrix}$ is

A) $\begin{bmatrix}\frac{3}{14}&\frac{2}{14}\\\frac{1}{14}&\frac{4}{14}\end{bmatrix}$ B) $\begin{bmatrix}\frac{4}{14}&\frac{-2}{14}\\\frac{1}{14}&\frac{3}{14}\end{bmatrix}$

C) $\begin{bmatrix}\frac{3}{14}&\frac{-2}{14}\\\frac{1}{14}&\frac{4}{14}\end{bmatrix}$ D) $\begin{bmatrix}\frac{4}{14}&\frac{2}{14}\\\frac{-1}{14}&\frac{3}{14}\end{bmatrix}$

203) The inverse of matrix $A=\begin{bmatrix}0&1&0\\1&0&0\\0&0&1\end{bmatrix}$ is

A) $\begin{bmatrix}1&0&0\\1&0&0\\0&1&0\end{bmatrix}$ B) $\begin{bmatrix}1&0&0\\0&1&0\\0&0&1\end{bmatrix}$

C) A D) A^T

204) If product of matrix A with $\begin{bmatrix}0&1\\2&-4\end{bmatrix}$ is $\begin{bmatrix}3&2\\1&1\end{bmatrix}$, then A^{-1} is given by

A) $\begin{bmatrix}0&-1\\2&-4\end{bmatrix}$

B) $\begin{bmatrix}0&-1\\-2&-4\end{bmatrix}$

C) $\begin{bmatrix}1&1\\2&0\end{bmatrix}$

D) $\begin{bmatrix}-1&3\\6&-16\end{bmatrix}$

205) If the product of the matrix $B=\begin{bmatrix}2&6&4\\1&0&1\\-1&1&-1\end{bmatrix}$ with a matrix A has inverse $C=\begin{bmatrix}-1&0&1\\1&1&3\\2&0&2\end{bmatrix}$, then A^{-1} equals

A) $\begin{bmatrix}-3&-5&5\\0&9&14\\2&2&6\end{bmatrix}$ B) $\begin{bmatrix}-3&-5&-5\\0&9&2\\2&14&6\end{bmatrix}$

C) $\begin{bmatrix}-3&5&5\\0&0&9\\2&14&16\end{bmatrix}$ D) $\begin{bmatrix}-3&-3&5\\0&9&2\\2&14&6\end{bmatrix}$

206) If $A=\begin{bmatrix}\cos\alpha&\sin\alpha\\-\sin\alpha&\cos\alpha\end{bmatrix}$ and $A.adj\ A=\begin{bmatrix}k&0\\0&k\end{bmatrix}$ then k is equal to

A) 0
B) $\sin\alpha\ \cos\alpha$
C) 1
D) $\cos 2\alpha$

207) If $A=\begin{bmatrix}2&-1&3\\4&2&5\\0&4&-1\end{bmatrix}$, then co-factor A_{32} is

A) 2 B) -8
C) 4 D) -2

208) The multiplicative inverse of matrix $\begin{bmatrix}2&1\\7&4\end{bmatrix}$ is

A) $\begin{bmatrix}4&-1\\-7&2\end{bmatrix}$ B) $\begin{bmatrix}-4&-1\\7&-2\end{bmatrix}$

C) $\begin{bmatrix}4&-7\\7&2\end{bmatrix}$ D) $\begin{bmatrix}4&-1\\-7&-2\end{bmatrix}$

209) Let $A=\begin{pmatrix}1&-1&1\\2&1&-3\\1&1&1\end{pmatrix}$ and

$(10)B=\begin{pmatrix}4&2&2\\-5&0&\alpha\\1&-2&3\end{pmatrix}$. If B is the inverse of matrix A, then α is

A) - 2 B) 2
C) - 1 D) 5

210) If $\begin{bmatrix}1&3&3\\1&4&4\\1&3&4\end{bmatrix}\begin{bmatrix}x\\y\\z\end{bmatrix}=\begin{bmatrix}12\\15\\13\end{bmatrix}$, then the value of x, y, z respectively are

A) 1, 2, 3 B) 3, 2, 1
C) 1, 1, 2 D) 2, 2, 1

211) Matrix A = $\begin{bmatrix}1&0&-k\\2&1&3\\k&0&1\end{bmatrix}$ is invertible for

A) k = -1
B) k = 1
C) k = 0
D) All real k

212) The matrix A satisfying $A\begin{bmatrix}1&5\\0&1\end{bmatrix}=\begin{bmatrix}3&-1\\6&0\end{bmatrix}$ is

A) $\begin{bmatrix}3&2\\6&-3\end{bmatrix}$ B) $\begin{bmatrix}3&-16\\6&30\end{bmatrix}$
C) $\begin{bmatrix}3&-3\\6&2\end{bmatrix}$ D) $\begin{bmatrix}3&-16\\6&-30\end{bmatrix}$

213) If A = $\begin{bmatrix}1&-1\\2&3\end{bmatrix}$ then M_{21} =

A) -1 B) 1
C) 2 D) 3

214) If A = $\begin{bmatrix}a&0\\0&\frac{1}{b}\end{bmatrix}$, then A^{-1}=

A) $\begin{bmatrix}-a&0\\0&-\frac{1}{b}\end{bmatrix}$ B) $\begin{bmatrix}-\frac{1}{a}&0\\0&-\frac{1}{b}\end{bmatrix}$
C) $\begin{bmatrix}-a&0\\0&b\end{bmatrix}$ D) $\begin{bmatrix}\frac{1}{a}&0\\0&b\end{bmatrix}$

215) If A= $\begin{bmatrix}1&2&1\\3&2&3\\2&1&2\end{bmatrix}$, then $a_{11}A_{11}+a_{21}A_{21}+a_{31}A_{31}$=

A) 1 B) |A|
C) 2 D) 3

216) If A is a non- singular matrix, then A(adj A) =

A) $|A|^2 I$ B) |A|I
C) I D) A

217) The inverse of the matrix $\begin{bmatrix}5&-2\\3&1\end{bmatrix}$ is

A) $\begin{bmatrix}1&3\\-2&5\end{bmatrix}$ B) $\frac{1}{13}\begin{bmatrix}-2&5\\1&3\end{bmatrix}$
C) $\begin{bmatrix}1&2\\-3&5\end{bmatrix}$ D) $\frac{1}{11}\begin{bmatrix}1&2\\-3&5\end{bmatrix}$

218) If A = $\begin{bmatrix}\cos x&\sin x\\-\sin x&\cos x\end{bmatrix}$, then A. (adj(A)) =

A) $\begin{bmatrix}-2&0\\0&-2\end{bmatrix}$ B) $\begin{bmatrix}1&1\\0&0\end{bmatrix}$
C) $\begin{bmatrix}0&1\\1&0\end{bmatrix}$ D) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$

219) The inverse of the matrix A= $\begin{bmatrix}2&0&-1\\5&1&0\\0&1&3\end{bmatrix}$ is

A) $\begin{bmatrix}3&-1&1\\-15&6&-5\\5&-2&2\end{bmatrix}$ B) $\begin{bmatrix}\frac{3}{2}&\frac{6}{2}&\frac{-5}{2}\\\frac{-15}{2}&\frac{-1}{2}&\frac{1}{2}\\5&-1&1\end{bmatrix}$
C) $\begin{bmatrix}3&6&2\\-15&-1&1\\5&-2&-5\end{bmatrix}$ D) $\begin{bmatrix}\frac{3}{2}&\frac{-1}{2}&\frac{1}{2}\\\frac{-15}{2}&\frac{6}{2}&\frac{-5}{2}\\5&-1&1\end{bmatrix}$

220) The solution of the equation 5x-7y = 2, 7x-5y = 3 are

A) x = 2, y = 1 B) $x=\frac{10}{24}, y=\frac{5}{24}$
C) x = -6, y = -5 D) $x=\frac{11}{24}, y=\frac{1}{24}$

221) The inverse of the matrix A= $\begin{bmatrix}1&2&-3\\2&3&2\\3&-3&-4\end{bmatrix}$ using adjoint method is

A) $\frac{1}{67}\begin{bmatrix}-6&17&13\\14&9&-1\\-15&-8&5\end{bmatrix}$ B) $\frac{1}{93}\begin{bmatrix}-6&17&13\\14&5&-8\\-15&9&-1\end{bmatrix}$
C) $\frac{1}{67}\begin{bmatrix}-6&5&17\\14&9&-8\\-15&13&-1\end{bmatrix}$ D) $\frac{1}{67}\begin{bmatrix}-6&17&13\\14&5&-8\\-15&9&-1\end{bmatrix}$

222) If $\begin{bmatrix}1&1&1\\1&-2&-2\\1&3&1\end{bmatrix}\begin{bmatrix}x\\y\\z\end{bmatrix}=\begin{bmatrix}0\\3\\4\end{bmatrix}$, then $\begin{bmatrix}x\\y\\z\end{bmatrix}$ is equal to

A) $\begin{bmatrix}1\\2\\-3\end{bmatrix}$ B) $\begin{bmatrix}1\\-2\\1\end{bmatrix}$
C) $\begin{bmatrix}1\\-2\\3\end{bmatrix}$ D) $\begin{bmatrix}1\\1\\1\end{bmatrix}$

223) If $\begin{bmatrix}1 & 1 & 1\\ 1 & -2 & -2\\ 1 & 3 & 1\end{bmatrix}\begin{bmatrix}x\\ y\\ z\end{bmatrix}=\begin{bmatrix}0\\ 3\\ 4\end{bmatrix}$, then $\begin{bmatrix}x\\ y\\ z\end{bmatrix}$ is equal to

A) $\begin{bmatrix}1\\ 1\\ 1\end{bmatrix}$ B) $\begin{bmatrix}1\\ -2\\ 3\end{bmatrix}$

C) $\begin{bmatrix}1\\ 2\\ -3\end{bmatrix}$ D) $\begin{bmatrix}1\\ -2\\ 1\end{bmatrix}$

224) If k is a scalar and I is a unit matrix of order 3, then adj(k I) =

A) $-k^2I$ B) $-k^3I$

C) k^2I D) k^3I

225) If matrix $A=\begin{bmatrix}1 & -1\\ 1 & 1\end{bmatrix}$, then

A) $A.\begin{bmatrix}1 & 1\\ -1 & 1\end{bmatrix}=2I$

B) $A'=\begin{bmatrix}1 & 1\\ 1 & -1\end{bmatrix}$

C) $A^{-1}=\begin{bmatrix}1 & 1\\ -1 & 1\end{bmatrix}$

D) $\lambda A=\begin{bmatrix}\lambda & -\lambda\\ 1 & -1\end{bmatrix}$ where λ is a non zero scalar

226) Inverse of the matrix $\begin{bmatrix}3 & -2 & -1\\ -4 & 1 & -1\\ 2 & 0 & 1\end{bmatrix}$ is

A) $\begin{bmatrix}1 & 2 & -4\\ 8 & -4 & -5\\ 3 & 5 & 2\end{bmatrix}$ B) $\begin{bmatrix}1 & 2 & 3\\ 2 & 5 & 7\\ -2 & -4 & -5\end{bmatrix}$

C) $\begin{bmatrix}1 & -3 & 5\\ 7 & 4 & 6\\ 4 & 2 & 7\end{bmatrix}$ D) $\begin{bmatrix}1 & 2 & 3\\ 3 & 3 & 7\\ -2 & -4 & -5\end{bmatrix}$

227) For any 2×2 matrix A, if A(adj A) = $\begin{bmatrix}10 & 0\\ 0 & 10\end{bmatrix}$, then $|A|=$

A) 100 B) 20

C) 10 D) 0

228) If $A=\begin{bmatrix}\cos\alpha & \sin\alpha\\ -\sin\alpha & \cos\alpha\end{bmatrix}$ and $A\,\text{adj}\,A=\begin{bmatrix}k & 0\\ 0 & k\end{bmatrix}$, then k is equal to

A) 1 B) 0

C) $\sin\alpha\cos\alpha$ D) $\cos2\alpha$

229) For any 2×2 matrix A, if A.(adj A)=$\begin{bmatrix}10 & 0\\ 0 & 10\end{bmatrix}$ then $|A|=$

A) 0 B) 20

C) 10 D) 100

230) The element of second row and third column in the inverse of $\begin{bmatrix}1 & 2 & 1\\ 2 & 1 & 0\\ -1 & 0 & 1\end{bmatrix}$ is

A) -2 B) 1

C) -1 D) 2

231) The matrix $\begin{bmatrix}3 & 1 & 2\\ 0 & -2 & 4\\ 5 & 6 & 3\end{bmatrix}$ is a

A) singular B) symmetric

C) non singular D) diagonal

232) If matrix $A=\begin{bmatrix}3 & 2 & 4\\ 1 & 2 & -1\\ 0 & 1 & 1\end{bmatrix}$ and $A^{-1}=1/k$ adj A, then k is

A) 7 B) 11

C) 1/7 D) -7

233) If $A=\begin{bmatrix}1 & -1\\ 2 & 3\end{bmatrix}$, then adj A is equal to

A) $\begin{bmatrix}3 & -1\\ -2 & 1\end{bmatrix}$ B) $\begin{bmatrix}3 & -2\\ 1 & 1\end{bmatrix}$

C) $\begin{bmatrix}3 & 1\\ -2 & 1\end{bmatrix}$ D) $\begin{bmatrix}-3 & -1\\ 2 & -1\end{bmatrix}$

234) If matrix $A=\begin{bmatrix}3 & 2 & 4\\ 1 & 2 & -1\\ 0 & 1 & 1\end{bmatrix}$ and $A^{-1}=\frac{1}{K}\text{adj}(A)$, then K is

A) 11 B) $\frac{1}{7}$

C) -7 D) 7

235) Inverse of the matrix $\begin{pmatrix}1 & -2\\ 3 & 4\end{pmatrix}$ is

A) $\begin{pmatrix}4 & 2\\ -3 & 1\end{pmatrix}$ B) $\frac{1}{10}\begin{pmatrix}4 & -2\\ -3 & 1\end{pmatrix}$

C) $\frac{1}{10}\begin{pmatrix}1 & -2\\ 3 & 4\end{pmatrix}$ D) $\frac{1}{10}\begin{pmatrix}4 & 2\\ -3 & 1\end{pmatrix}$

236) The matrix $\begin{bmatrix}\lambda & -1 & 4\\ -3 & 0 & 1\\ -1 & 1 & 2\end{bmatrix}$ is invertible, if

A) $\lambda\neq-18$

B) $\lambda\neq-16$

C) $\lambda\neq-17$

D) $\lambda\neq-15$

237) If $A=\begin{bmatrix}a & b\\ c & d\end{bmatrix}$, then adj (adj A) is equal to

A) adj A B) -A

C) A^T D) A

238) If A is a singular matrix of order n, then A.(adj A) is
A) Row matrix
B) Zero matrix
C) Unit matrix
D) Column matrix

239) The inverse of a matrix $A=\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is

A) $\begin{pmatrix} b & -a \\ d & -c \end{pmatrix}$ B) $\frac{1}{|A|}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

C) $\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$ D) $\frac{1}{(ad-bc)}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

240) If $A=\begin{bmatrix} -1 & 2 \\ 2 & -1 \end{bmatrix}$ and $B=\begin{bmatrix} 3 \\ 1 \end{bmatrix}$, $AX=B$, then $X=$

A) $\begin{bmatrix} 5 \\ 7 \end{bmatrix}$ B) $\frac{1}{3}[5\ \ 7]$

C) $\frac{1}{3}\begin{bmatrix} 5 \\ 7 \end{bmatrix}$ D) [5 7]

241) The inverse of the matrix $\begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}$ is

A) $\begin{bmatrix} \frac{4}{14} & \frac{-2}{14} \\ \frac{1}{14} & \frac{3}{14} \end{bmatrix}$ B) $\begin{bmatrix} \frac{3}{14} & \frac{2}{14} \\ \frac{1}{14} & \frac{4}{14} \end{bmatrix}$

C) $\begin{bmatrix} \frac{4}{14} & \frac{2}{14} \\ \frac{-1}{14} & \frac{3}{14} \end{bmatrix}$ D) $\begin{bmatrix} \frac{3}{14} & \frac{-2}{14} \\ \frac{1}{14} & \frac{4}{14} \end{bmatrix}$

242) If A and B are two square matrices such that $B = -A^{-1}BA$, then $(A + B)^2$=
A) 0
B) $A^2 + 2AB + B^2$
C) $A^2 + B^2$
D) A + B

243) If $A=\begin{bmatrix} 2 & 3 \\ 4 & 6 \end{bmatrix}$, then A^{-1} =

A) $\begin{bmatrix} -2 & 4 \\ -3 & 6 \end{bmatrix}$ B) $\begin{bmatrix} 1 & 2 \\ -3/2 & 3 \end{bmatrix}$

C) $\begin{bmatrix} 2 & -3 \\ 4 & 6 \end{bmatrix}$ D) Does not exist

244) If $A=\begin{bmatrix} i & 0 \\ 0 & i/2 \end{bmatrix}$ $(i=\sqrt{-1})$, then A^{-1} =

A) $\begin{bmatrix} 0 & i \\ 2i & 0 \end{bmatrix}$ B) $\begin{bmatrix} i & 0 \\ 0 & 2i \end{bmatrix}$

C) $\begin{bmatrix} -i & 0 \\ 0 & -2i \end{bmatrix}$ D) $\begin{bmatrix} i & 0 \\ 0 & i/2 \end{bmatrix}$

245) The inverse of the matrix $A=\begin{bmatrix} 1 & 3 & 4 \\ 2 & 1 & 2 \\ 5 & 1 & 1 \end{bmatrix}$ is

A) $\frac{1}{11}\begin{bmatrix} -1 & 1 & 2 \\ 8 & -19 & 6 \\ -3 & 14 & -5 \end{bmatrix}$ B) $\frac{1}{11}\begin{bmatrix} -1 & 1 & 2 \\ 8 & -6 & 19 \\ 14 & -3 & -5 \end{bmatrix}$

C) $\frac{1}{11}\begin{bmatrix} -1 & 1 & 2 \\ 8 & -6 & 19 \\ -3 & 14 & -5 \end{bmatrix}$ D) $\frac{1}{11}\begin{bmatrix} -1 & 1 & 2 \\ 8 & -19 & 6 \\ 14 & -3 & -5 \end{bmatrix}$

246) Which of the following is not true?
A) Adjoint of a diagonal matrix is diagonal.
B) Adjoint of symmetric matrix is symmetric.
C) If determinant of a square matrix is non-zero, then it is non singular.
D) Every skew-symmetric matrix of odd order is non-singular.

247) The solution of the equation $\begin{bmatrix} 1 & 0 & 1 \\ -1 & 1 & 0 \\ 0 & -1 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$ is (x, y, z) =

A) (-1, 0, 2) B) (0, -1, 2)
C) (-1, 2, 2) D) (1, 1, 1)

248) The element of second row and third column in the inverse of $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$ is

A) - 1 B) - 2
C) 1 D) 2

249) For any 2×2 matrix A, if $A(\text{adj } A)=\begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$, then $|A|$ is equal to

A) 100 B) 20
C) 10 D) 0

250) Inverse matrix of $\begin{bmatrix} 4 & 7 \\ 1 & 2 \end{bmatrix}$

A) $\begin{bmatrix} -2 & 1 \\ 7 & -4 \end{bmatrix}$ B) $\begin{bmatrix} -2 & 7 \\ 1 & -4 \end{bmatrix}$

C) $\begin{bmatrix} 2 & -1 \\ -7 & 4 \end{bmatrix}$ D) $\begin{bmatrix} 2 & -7 \\ -1 & 4 \end{bmatrix}$