M1

Maximum Marks: 60
Total No. of Questions: 60
Total Duration: 80 Minutes
Maximum Time for Answering: 70 Minutes
Date: _____/_____/_______

MENTION YOUR NUMBER

YOUR COLLEGE NAME HERE

VERSION CODE

25UGE(MOCK)

Subject Code	GT-M-01

Do's:

1. Check whether the CET Number has been entered and shaded in the respective circles on the OMR answer sheet.
2. The version code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
3. The Version Code and Serial number of this question booklet should be entered on the Nominal Roll without any mistakes.
4. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

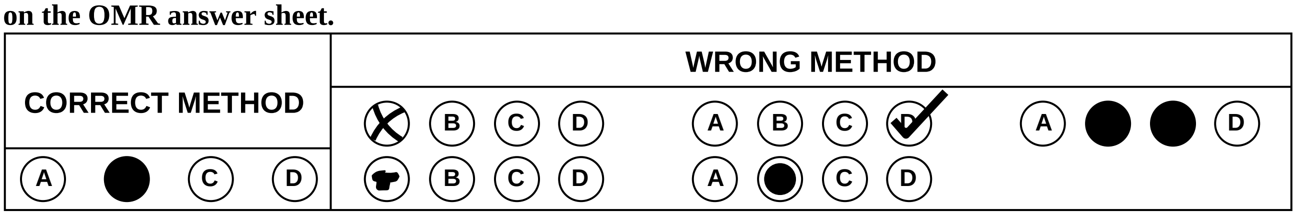
DON'Ts:

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**

- Do not remove the seal present on the right-hand side of this question booklet.
  - Do not; look inside this question booklet or start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. In case of usage of signs and symbols in the questions, the regular textbook connotation should be considered unless stated otherwise.
2. This question booklet contains 60 questions and each question will have one statement and four different options / responses and out of which you have to choose one correct answer.
3. Remove the paper seal of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., If so, get if replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
4. Completely **darken/shade** the relevant circle with a **blue or black ink ballpoint pen against the question number on the OMR answer sheet.**



5. Please note that even a, minute unintended ink dot on the OMR answer sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
6. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
7. Hand over the **OMR** answer sheet to the room invigilator as the final bell rings.

Name of candidate (in capitals): ____

Roll Number: ______________________ Invigilator's Signature: ______________________

1. If A = {1, 3, 5, 7, 9, 11, 13, 15, 17} , B = {2, 4, ... , 18} and N the set of natural numbers is the universal set, then $A' \cup (A \cup B) \cap B'$) is
(1) N (2) B
(3) A (4) ϕ

2. If $f(x) = 2x^2$, find $\dfrac{f(3.8) - f(4)}{3.8 - 4}$
(1) 156 (2) 15.6
(3) 1560 (4) 1.56

3. Let S be the set of all real numbers and let R be a relation on S, defined by a Rb $\Leftrightarrow$ $|a - b| < 1$. Then, R is
(1) Reflexive and symmetric but not transitive
(2) Reflexive and transitive but not symmetric
(3) Symmetric and transitive but not reflexive
(4) An equivalence relation

4. If A and B have 4 and 6 elements respectively then the number of one – one function from A to B is
(1) 6^4 (2) 4^4
(3) 240 (4) 360

5. Let f : R $\rightarrow$ R be a function defined by $f(x) = \dfrac{x^2 - 8}{x^2 + 2}$. Then, f is
(1) one – one and onto
(2) one – one but not onto
(3) onto but not one – one
(4) neither one – one nor onto

6. A mapping f : n $\rightarrow$ N, where N is the set of natural numbers is defined as f(n) = $\begin{cases} n^2, & \text{fornodd} \\ 2n+1, & \text{forneven} \end{cases}$
for n $\in$ N. Then, f is
(1) bijective
(2) neither injective nor surjective
(3) injective but not surjective
(4) surjective but not injective

7. A wire of length 121 cm is bent to form an arc of a circle of radius 180 cm. The angle subtended at the centre by the arc is
(1) 39°10' (2) 34°40'
(3) 36°20' (4) 38° 30'

8. If A, B, C are in A.P., then $\dfrac{\sin A - \sin C}{\cos C - \cos A}$ =
(1) tan 2B (2) tan 3B
(3) tan B (4) cot B

9. If x + iy = $\dfrac{3+5i}{7-6i}$, then y =
(1) $\dfrac{43}{85}$ (2) $\dfrac{-9}{85}$
(3) $\dfrac{9}{85}$ (4) $\dfrac{53}{85}$

10. The solution set for $|3x - 2| \le \dfrac{1}{2}$
(1) $[\dfrac{5}{6}, \dfrac{2}{3}]$ (2) $[\dfrac{2}{3}, \dfrac{2}{3}]$
(3) $[\dfrac{1}{2}, \dfrac{5}{6}]$ (4) $[\dfrac{5}{6}, \dfrac{1}{2}]$

11. The sum of all the numbers which can be formed by using the digits 1, 3, 5, 7, 9 all at a time and which have no digit repeated is
(1) 33333000 (2) 266664
(3) 600 (4) 666660

12. If $\left(1 - x + x^2\right)^n = a_0 + a_1x + a_2x^2 + \ldots + a_{2n}x^{2n}$, then $a_0 + a_2 + a_4 + \ldots + a_{2n}$ equals.
(1) $3^n + \dfrac{1}{2}$ (2) $\dfrac{3^n + 1}{2}$
(3) $\dfrac{3^n - 1}{2}$ (4) $\dfrac{1 - 3^n}{2}$

13. If a, b, c are in A.P. and x, y, z are in G.P., then the value of $x^{b-c}\, y^{c-a}\, z^{a-b}$ is
(1) $x^a y^b z^c$ (2) 1
(3) 0 (4) xyz

14. The acute angle between the lines y = 2x and y = – 2x is
(1) greater than 60° (2) 90°
(3) less than 60° (4) 60°

15. The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half of the distance between the foci is
(1) $\dfrac{8}{\sqrt{3}}$ (2) $\dfrac{4}{\sqrt{3}}$
(3) $\dfrac{2}{\sqrt{3}}$ (4) $\dfrac{4}{3}$

16. $\lim_{x\to 0}\frac{\tan 2x - x}{3x-\sin x}$ is equal to

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

(3) $\frac{1}{4}$ (4) $-\frac{1}{2}$

17. $\lim_{x\to 4}\frac{3-\sqrt{5+x}}{1-\sqrt{5-x}}$ =

(1) does not exist (2) 0

(3) $-\frac{1}{3}$ (4) $\frac{1}{3}$

18. The mean and standard deviation of 100 items are 50, 5 and that of 150 items are 40, 6 respectively. What is the combined standard deviation of all 250 items?

(1) 7.5 (2) 7.7

(3) 7.3 (4) 7.1

19. The point equidistant from the points (0, 0, 0), (1, 0, 0), (0, 2, 0) and (0, 0, 3) is

(1) $(\frac{-1}{2}, -1, \frac{-3}{2})$ (2) $(-1, -2, 3)$

(3) (1, 2, 3) (4) $(\frac{1}{2}, 1, \frac{3}{2})$

20. The value of $\sin(2\sin^{-1}(0.6))$ is

(1) 0.96 (2) 0.48

(3) sin 1.2 (4) 1.2

21. The principal value of $\cos^{-1}\left(\frac{1}{2}\right)+\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)$ is

(1) π (2) $\frac{\pi}{6}$

(3) $\frac{\pi}{12}$ (4) $\frac{\pi}{3}$

22. For any square matrix A, AA’ is a

(1) Diagonal matrix

(2) Skew Symmetric matrix

(3) Symmetric matrix

(4) Unit matrix

23. If $A=\begin{bmatrix}1 & 2\\ 4 & -3\end{bmatrix}$ & $f(x) = 2x^2 - 4x + 5$ then f((a) =?

(1) $\begin{bmatrix}19 & -11\\ -27 & 51\end{bmatrix}$ (2) $\begin{bmatrix}19 & -32\\ -16 & 51\end{bmatrix}$

(3) $\begin{bmatrix}19 & -16\\ -32 & 51\end{bmatrix}$ (4) $\begin{bmatrix}29 & -11\\ -27 & 41\end{bmatrix}$

24. $\begin{vmatrix}a_1 & b_1 & c_1 & d_1\\ 0 & a_2 & b_2 & c_2\\ 0 & 0 & a_3 & b_3\\ 0 & 0 & 0 & a_4\end{vmatrix}$ is equal to

(1) $a_1 + a_2 + a_3 + a_4$ (2) $a_1a_2a_3a_4$

(3) 0 (4) 1

25. If f(x) = $\begin{vmatrix}0 & x-1 & x-2\\ x+1 & 0 & x-c\\ x+2 & x+c & 0\end{vmatrix}$, then

(1) f(1) = 0 (2) f(3) = 0

(3) f(0) = 0 (4) f(2) = 0

26. For the set of linear equations

$\lambda x - 3y + z = 0$

$x + \lambda y + 3z = 1$

$3x + y + 5z = 2$

the value of λ, for which the equations does not have unique solution is

(1) $-1, \frac{-11}{5}$ (2) $1, \frac{11}{5}$

(3) $-1, \frac{11}{5}$ (4) $-\frac{11}{5}$, 1

27. Let A be a non-singular matrix of the order $n\times n$ the $|adj\, A|$ is equal to

(1) |A| (2) $|A|^{n-1}$

(3) n|A| (4) $|A|^n$

28. The function f(x) = |cos x| is

(1) everywhere continuous but not differentiable at $(2n+1)\frac{\pi}{2}$, $n \in Z$

(2) everywhere continuous and differentiable

(3) neither continuous nor differentiable at $(2n+1)\frac{\pi}{2}$, $n \in Z$

(4) either continuous or differentiable at $(2n+1)\frac{\pi}{2}$, $n \in Z$

29. If x = A cos 4t + B sin 4t, then $\frac{d^2x}{dt^2}$ is equal to
(1) x (2) – 16x
(3) – x (4) 16x

30. If y = $\sin^2(x^3)$, then $\frac{dy}{dx}$ is equal to:
(1) $3x^3\sin x^3\cos x^3$ (2) $2x^2\sin^2(x^3)$
(3) $2\sin x^3\cos x^3$ (4) $6x^2\sin x^3\cos x^3$

31. The function f(x) $=\begin{cases}\frac{\sin x}{x}+\cos x, & \text{if } x\neq 0\\ k, & \text{if } x=0\end{cases}$ is continuous at x = 0, then the value of k is
(1) 1 (2) 3
(3) 1.5 (4) 2

32. Differential of $\log[\log(\log x^5)]$ w.r.t x is:
(1) $\frac{5x^4}{\log(x^5)\log(\log x^5)}$
(2) $\frac{5x^4}{\log x^5\log(\log x^5)}$
(3) $\frac{5}{x\log(x^5)\log(\log x^5)}$
(4) $\frac{5}{x\log(\log x^5)}$

33. The minimum value of $\frac{x}{\log x}, x>1,$ is
(1) $\frac{2}{e}$ (2) e
(3) – e (4) $\frac{1}{e}$

34. The interval of increase of the function
f(x) = x – e^x + tan $\left(\frac{2\pi}{7}\right)$ is
(1) $(0,\infty)$ (2) $(-\infty,0)$
(3) $(-\infty,1)$ (4) $(1,\infty)$

35. The edge of a cube is increasing at a rate of 7 cm/s. Find the rate of change of area of the cube when a = 3cm.
(1) 498 cm^2/s (2) 287 cm^2/s
(3) 252 cm^2/s (4) 504 cm^2/s

36. Let f(x) = $x^3 + ax^2 + bx + 5\sin^2 x$ be an increasing function on the set R. Then, a and b satisfy
(1) $a^2-3b+15>0$
(2) a > 0 and b > 0
(3) $a^2-3b+15<0$
(4) $a^2-3b-15>0$

37. The function f(x) = x^3 + 3x is increasing in interval
(1) R (2) $(0,\infty)$
(3) $(-\infty,0)$ (4) (0, 1)

38. $\int x^2e^{x^3}dx$ equals
(1) $\frac{1}{2}e^{x^3}+C$ (2) $\frac{1}{2}e^{x^2}+C$
(3) $\frac{1}{3}e^{x^3}+C$ (4) $\frac{1}{3}e^{x^2}+C$

39. $\int\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ dx = ?
(1) $2x\tan^{-1}x-\log(1+x^2)+C$
(2) $-2x\tan^{-1}x-2\log(1+x^2)+C$
(3) $3x\tan^{-1}x+\log(1-x^2)+C$
(4) $2x\tan^{-1}x+\log(1+x^2)+C$

40. The value of: $\int_0^{\pi}\frac{x\tan x}{\sec x+\cos x}$ dx is
(1) $\frac{\pi^2}{4}$ (2) $\frac{3\pi^2}{2}$
(3) $\frac{\pi^2}{2}$ (4) $\frac{\pi^2}{3}$

41. $\int_0^1 e^{-\sin^2 x}$ dx is equal to
(1) $1+\frac{1}{e}$ (2) 2
(3) None of these (4) – 1

42. If $\int\frac{x^3dx}{\sqrt{1+x^2}}=a(1+x^2)^{\frac{3}{2}}+b\sqrt{1+x^2}+C$ then
(1) a = $\frac{1}{3}$, b = 1 (2) a = $\frac{-1}{3}$, b = – 1
(3) a = $\frac{1}{3}$, b = – 1 (4) a = $\frac{-1}{3}$, b = 1

43. The area bounded by the angle bisectors of the lines $x^2 - y^2 + 2y = 1$ and $x + y = 3$ is
(1) 6 sq. units (2) 3 sq. units
(3) 4 sq. units (4) 2 sq. units

44. The solution of the differential equation
$\frac{dx}{x} + \frac{dy}{y} = 0$ is:
(1) $\frac{1}{x} + \frac{1}{y} = C$ (2) log x – log y = C
(3) xy = C (4) x + y = C

45. The solution of the differential equation $\frac{dy}{dx} + \frac{2xy}{1+x^2} = \frac{1}{\left(1+x^2\right)^2}$ is:
(1) $\frac{y}{1+x^2} = c + \tan^{-1} x$
(2) $y(1 + x^2) = c + \sin^{-1} x$
(3) $y(1 + x^2) = c + \tan^{-1} x$
(4) $y \log(1 + x^2) = c + \tan^{-1} x$

46. The solution of $\frac{dy}{dx} = |x|$ is
(1) $y = \frac{x^2}{2} + C$ (2) $y = \frac{x|x|}{2} + C$
(3) $y = \frac{|x|}{2} + C$ (4) $y = \frac{x^3}{2} + C$

47. If $\vec{a}, \vec{b}, \vec{c}$ are three non – zero vectors, no two of which are collinear and the vector $\vec{a} + \vec{b}$ is collinear with $\vec{c}$, $\vec{b} + \vec{c}$ is collinear with $\vec{a}$,then $\vec{a} + \vec{b} + \vec{c} =$
(1) $\vec{a}$ (2) $\vec{c}$
(3) $\vec{b}$ (4) None of these

48. The unit vector perpendicular to the vectors $\hat{i} - \hat{j}$ and $\hat{i} + \hat{j}$ forming a right – handed system is
(1) $\frac{\hat{i} - \hat{j}}{\sqrt{2}}$ (2) $-\hat{k}$
(3) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$ (4) $\hat{k}$

49. If β is perpendicular to both α and β, where $\alpha = \hat{k}$ and $\gamma = \gamma = 2\hat{i} + 3\hat{j} + 4\hat{k}$,
then what is β equal to?
(1) $-2\hat{i} + 3\hat{j}$ (2) $3\hat{i} + 2\hat{j}$
(3) $2\hat{i} - 3\hat{j}$ (4) $-3\hat{i} + 2\hat{j}$

50. The scalar product of the vector $\hat{i} + \hat{j} + \hat{k}$ with a unit vector along the sum of vectors $2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\lambda\hat{i} + 2\hat{j} + 3\hat{k}$ is equal to one. Find the value of λ.
(1) $\lambda = 1$ (2) $\lambda = -2$
(3) $\lambda = 2$ (4) $\lambda = -1$

51. If the projection of $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$ on $\vec{b} = 2\hat{i} + \lambda\hat{k}$ is zero, then the value of λ is:
(1) 0 (2) 1
(3) $\frac{-3}{2}$ (4) $\frac{-2}{3}$

52. The lines $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{x-1}{-2} = \frac{y-2}{-4} = \frac{z-3}{-6}$ are
(1) parallel (2) intersecting
(3) skew (4) coincident

53. The angle between the lines $\frac{x-2}{2} = \frac{y-1}{7} = \frac{z+3}{-3}$ and $\frac{x+2}{-1} = \frac{y-4}{2} = \frac{z-5}{4}$ is
(1) $\cos^{-1}\left(\frac{3}{8}\right)$ (2) $\frac{\pi}{3}$
(3) $\frac{\pi}{6}$ (4) $\frac{\pi}{2}$

54. The direction ratios of the line
x – y + z – 5 = 0 = x – 3y – 6 are proportional to
(1) 3, 1, – 2 (2) $\frac{3}{\sqrt{14}}, \frac{1}{\sqrt{14}}, \frac{-2}{\sqrt{14}}$
(3) 2, – 4, 1 (4) $\frac{2}{\sqrt{41}}, \frac{-4}{\sqrt{41}}, \frac{1}{\sqrt{41}}$

55. Given two independent events A and B such that P(A) = 0.3, P(B) = 0.6 and P(A' $\cap$ B') is
(1) 0.9 (2) 0.1
(3) 0.28 (4) 0.18

56. Assume that in a family, each child is equally likely to be a boy or a girl. A family with three children is chosen at random. The probability that the eldest child is a girl given that the family has at least one girl is

(1) $\frac{1}{3}$ (2) $\frac{4}{7}$

(3) $\frac{2}{3}$ (4) $\frac{1}{2}$

57. Two students X and Y appeared in an examination. The probability that X will qualify for the examination is 0.05 and Y will qualify for the examination is 0.10. The probability that both will qualify for the examination is 0.02. What is the probability that only one of them will qualify for the examination?

(1) 0.14 (2) 0.12

(3) 0.11 (4) 0.15

58. If P(B)= $\frac{3}{5}$, $P\left(\frac{A}{B}\right)=\frac{1}{2}$ and $P\left(A\cup B\right)=\frac{4}{5}$, then $P(A \cup B)' + P(A' \cup B) =$

(1) $\frac{1}{5}$ (2) $\frac{4}{5}$

(3) $\frac{1}{2}$ (4) 1

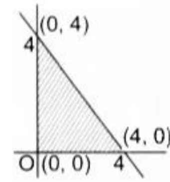
SPACE FOR ROUGH WORK

59. If A and B are two independent events with P(A) = $\frac{1}{3}$ and P(B) = $\frac{1}{4}$,then P(B'|A) is equal to:

(1) $\frac{1}{3}$ (2) $\frac{3}{4}$

(3) $\frac{1}{4}$ (4) 1

60. Feasible region shaded for a LPP is shown in figure. Maximum of Z = 2x + 3y occurs at the point



(1) (0, 0) (2) (4, 0)

(3) (0, – 4) (4) (0, 4)

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