UNIVERSAL ACADEMY

Icon of Success and Excellence

MOCK CET - 2015

DATE	SUBJECT	TIME
21.04.2015	MATHEMATICS	2.30 PM TO 3.40 PM

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
60	80 MINUTES	70 MINUTES

MENTION YOUR CET NUMBER					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					B–2	

DOs:

1. Check whether the CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. This Question Booklet is issued to you by the Invigilator after **1st Bell** i.e, after **2.30 p.m**
3. The Serial Number of this question booklet should be entered on the OMR answer sheet.
4. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should be shaded completely.
5. Compulsory sign at the bottom portion of the OMR answer sheet in the space provided.

DONTs:

1. **The timing and marks printed on the OMR answer sheet should not be damaged/mutilated/ spoiled.**
2. The **2nd Bell** rings at **2.35 p.m.** till then,
   - Do not remove the seal/staple present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 60 questions and each question will have one statement and four distraction (four different options / choices).
2. After the **2nd Bell** is rung at **2.35 p.m**. Remove the seal/staple present on the right hand side of this question booklet and start answering on the OMR answer sheet.
3. During the subsequent 70 minutes:
   - Read each question carefully.
   - Choose the correct answer from out of the four available distracters (options /choices) given under each question/statement.
   - Completely **darken / shade** the relevant circle with a **BLUE OR BLACK INK BALLPOINT PEN against the question number on the answer sheet.**

CORRECT METHOD OF SHADING THE CIRCLE ON THE ANSWER SHEET IS AS SHOWN BELOW:

4. Please note that even a minute unintended ink dot on the answer sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR sheet.
5. Use the space provided on each page of the question booklet for Rough work. Do not use the OMR answer sheet for the same.
6. After the **last bell** is rung at **3.45 pm** stop writing on the OMR answer sheet and affix your LEFT HAND THUMB IMPRESSION on the OMR answer sheet as per the instructions.
7. Hand over the OMR answer sheet to the room invigilator as it is.
8. After separating and retaining the top sheet, (UA copy) the invigilator will return the bottom sheet replica (candidate's copy) to you to carry home for self – evaluation.
9. Preserve the replica of the OMR answer sheet for a minimum period of ONE week. For results, log on to the website www.uaes.in 5 days after the examination.

MATHEMATICS CET – 2

1. If $f(a+b-x)=f(x)$ then $\int_a^b xf(x)dx$ is equal to

   a) $\frac{a+b}{2}\int_a^b f(b-x)dx$ b) $\frac{a+b}{2}\int_a^b f(x)dx$

   c) $\frac{b-a}{2}\int_a^b f(x)dx$ d) $\frac{a+b}{2}\int_a^b f(a+b+x)dx$.

2. If $\int_{-1}^{4} f(x)dx=4$ and $\int_2^6 (3-f(x))dx=7$ then the value of $\int_{-1}^{2} f(x)dx$ is

   a) –2 b) 3 c) 4 d) 5

3. $\int_{-3}^{2}\{|x+1|+|x+2|+|x-1|\}dx$ is equal to

   a) $\frac{31}{2}$ b) $\frac{35}{2}$ c) $\frac{47}{2}$ d) $\frac{39}{2}$

4. $I_1=\int_0^{2\pi} f(\cos^2 x)dx$ and $I_2=\int_0^{\pi} f(\cos^2 x)dx$ then

   a) $I_1 = I_2$ b) $3\ I_1 = I_2$ c) $I_1 = 3\ I_2$ d) $I_1 = 5\ I_2$

5. Let s be the set of all real numbers, A relation R has been defined on s by aRb $\Leftrightarrow |a-b|\le 1$, then R is

   a) reflexive and transitive but not symmetric b) an equivalence relation
   c) symmetric and transitive but not reflexive d) reflexive and symmetric but not transitive

6. For any two real numbers an operation $*$ defined by $a*b=a+b+2$ is

   a) commutative but not associate c) associate but not commutative
   c) neither commutative nor associative d) both commutative and associative

7. The domain of $\sin^{-1}\left(\log_2\left(\frac{x}{12}\right)\right)$ is

   a) [2, 12] b) [–1, 1] c) [6, 24] d) $\left[\frac{2}{3},24\right]$

8. A mapping $f: N\to N$ where N is the set of natural numbers is defined as

   $f(x)=\begin{cases} n^2 & for\ n\ odd \\ 2n+1 & for\ n\ even \end{cases}$ $n\in N$. Then f is

   a) snjective but not bijective b) injective but not snjective
   c) bijective d) neither injective nor snjective

9. Suppose $f(x)=(x+1)^2$ for $x\ge -1$. If $g(x)$ is a function whose graph is the reflection of the graph of $f(x)$ in the line $y=x$ then $g(x)$ =

   a) $-\sqrt{x}-1$ b) $\sqrt{x}-1$ c) $\frac{1}{(x+1)^2}\ x>-1$ d) $\sqrt{x}+1$

10. A polygon has 54 diagonals. Number of sides of this polygon is

    a) 12 b) 15 c) 16 d) 19

11. The value of $\cos(2\tan^{-1}(-7))$ is

    a) $\frac{49}{50}$ b) $-\frac{49}{50}$ c) $\frac{24}{25}$ d) $-\frac{24}{25}$

12. If $f(x)=\sin^{-1}\left[\frac{\sqrt{3}}{2}x-\frac{1}{2}\sqrt{1-x^2}\right]-\frac{1}{2}\le x\in 1$ then $f(x)$ is equal to

a) $\sin^{-1}\frac{1}{2}-\sin^{-1}x$ b) $\sin^{-1}x-\pi/2$ c) $\sin^{-1}x+\frac{\pi}{6}$ d) $\sin^{-1}x-\frac{\pi}{3}$

13. The number of 3 x 3 non-singular matrices with four entries as 1 and all other entries as 0 is
a) less then 4 b) < 5 c) < 6 d) at least 7

14. If $A=\begin{bmatrix}6&8&5\\4&2&3\\9&7&1\end{bmatrix}$ is the sum of a symmetric matrix B and skew-symmetric matrix C then B is

a) $\begin{bmatrix}6&6&7\\6&2&5\\7&5&1\end{bmatrix}$ b) $\begin{bmatrix}0&2&-2\\-2&5&-2\\2&2&0\end{bmatrix}$ c) $\begin{bmatrix}6&6&7\\-6&2&-5\\-7&5&1\end{bmatrix}$ d) $\begin{bmatrix}0&6&-2\\2&0&-2\\-2&-2&0\end{bmatrix}$

15. If A is singular matrix than A adj A is a
a) Scalar matrix b) Zero matrix c) Identily matrix d) Orthogonal matrix

16. A is a square matrix if order 4 and I is a unit matrix then it is true that
a) det (2A) = 2 det (A) b) det (2A) = 16 det (A)
c) det (–A) = – det (A) d) det (A + I) = det (A) + I

17. If $D=\begin{bmatrix}1&1&1\\1&1+x&1\\1&1&1+y\end{bmatrix}$ for $x\neq 0, y\neq 0$ then D is
a) divisible by neither x nor y b) divisible by both x and y
c) divisible by x but not y d) divisible by y but not x

18. If ω is a root of unity and $A=\begin{bmatrix}1&1&1\\1&\omega&\omega^2\\1&\omega^2&\omega\end{bmatrix}$ then A^{-1}

a) $\begin{bmatrix}1&\omega&\omega^2\\\omega^2&1&\omega\\\omega&\omega^2&1\end{bmatrix}$ b) $\frac{1}{3}\begin{bmatrix}1&1&1\\1&\omega^2&\omega\\1&\omega&\omega^2\end{bmatrix}$ c) $\begin{bmatrix}1&\omega&\omega^2\\1&\omega^2&\omega\\1&1&1\end{bmatrix}$ d) $\frac{1}{2}\begin{bmatrix}1&\omega&\omega^2\\1&\omega^2&\omega\\1&1&1\end{bmatrix}$

19. The local maximum value of the function f given by $f(x)=-|x|+5 x\in R$ is
a) 5 b) +15 c) 20 d) 30

20. The two curves $x^2-3xy^2+2=0$ and $3x^2y-y^3=2$
a) touch each other b) cut at right angle c) cut at angle $\frac{\pi}{3}$ d) cut at an angle $\frac{\pi}{4}$

21. The area of the region bounded by the curve $y=x^2$ and the line y = 16 is
a) $\frac{32}{3}$ b) $\frac{256}{3}$ c) $\frac{64}{3}$ d) $\frac{128}{3}$

22. The area of the region bounded by the curve $x^2=4y$ and the straight line x = 4y – 2 is
a) $\frac{3}{8}$ sq units b) $\frac{5}{8}$ sq units c) $\frac{7}{8}$ sq units d) $\frac{9}{8}$ sq units

23. The degree of the differential equations $\frac{d^2y}{dx^2}+3\left(\frac{dy}{dx}\right)2=x^2\log\left(\frac{d^2y}{dx^2}\right)$ is
a) 1 b) 2 c) 4 d) not defined

24. The integrating factor of the differential equations $\frac{dy}{dx}+y=\frac{1+x}{x}$ is

a) $\frac{x}{e^x}$ b) $\frac{e^x}{x}$ c) $-xe^x$ d) e^x

25. If $\vec{a}$ and $\vec{b}$ unit vectors then what is the angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}\vec{a}-\vec{b}$ to be unit vector?
a) 30^O b) 45^O c) 80^O d) 90^O

26. The coordinates of the foot of the perpendicular drawn from the point (2, 5, 7) on the x-axis are given by
a) (2, 0, 0) b) (0, 5, 0) c) (0, 0, 7) d) (0, 5, 7)

27. The $\sin e$ of the angle between the straight line $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ and the plane $2x-2y+2=5$ is
a) $\frac{10}{6\sqrt{5}}$ b) $\frac{4}{5\sqrt{2}}$ c) $\frac{2\sqrt{3}}{5}$ d) $\frac{\sqrt{2}}{10}$

28. The reflexian of the point (α,β,γ) in the xy-plane is
a) $(\alpha,\beta,0)$ b) $(0,0,\gamma)$ c) $(-\alpha,-\beta,\gamma)$ d) $(\alpha,\beta,-\gamma)$

29. The plane 2x – 3y + 6z – 11 = 0 makes an angle $\sin^{-1}(\alpha)$ with x-axis. The value of α is equal to
a) $\frac{\sqrt{3}}{2}$ b) $\frac{\sqrt{2}}{3}$ c) $\frac{2}{7}$ d) $\frac{3}{7}$

30. The area of the quadrilateral ABCD where A(0, 4, 1) B(2, 3, –1) C(4, 5, 0) and D (2, 6, 2) is equal to
a) 9 sq units b) 18 sq units c) 27 sq units d) 81 sq units

31. Let A and B be two events such that P(A) = · 6 P(B) = · 2 and P(A/B) = 0.5. Then P(A'/B') =
a) $\frac{1}{10}$ b) $\frac{3}{10}$ c) $\frac{3}{8}$ d) $\frac{6}{7}$

32. Let x be a descrate random variable. The probability distribution of x is given below

X	30	10	–10
P(x)	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{1}{2}$

Then P(x) is equal to
a) 6 b) 4 c) 3 d) –5

33. Two clice are thrown simultaneously, the probability of obtaining a total score of 5 is
a) $\frac{1}{18}$ b) $\frac{1}{12}$ c) $\frac{1}{9}$ d) $\frac{1}{36}$

34. A bag X contains 2 white and 3 black balls and another bag Y contains 4 white and 2 black balls one bag is selected at random and a ball is drawn from it. Then the probability in the ball choosen be white is
a) $\frac{2}{15}$ b) $\frac{7}{15}$ c) $\frac{8}{15}$ d) $\frac{14}{15}$

35. The area of the parallelogram whose adjacent sides are $\hat{i}+\hat{k}$ and $\hat{i}+\hat{j}$ is
a) 2 b) $2\sqrt{3}$ c) –2 d) $\sqrt{3}$

36. The magnitude of cross product of two vectors in $\sqrt{3}$ times the dot product. The angle lets the vector is
a) $\frac{\pi}{6}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

37. If the vectors $2\hat{i}-3\hat{j}+4\hat{k}$ $\hat{i}+2\hat{j}-\hat{k}$ and $m\hat{i}-\hat{j}+2\hat{k}$ are coplanes then the value of m is
a) $\frac{5}{8}$ b) $\frac{8}{5}$ c) $-\frac{7}{4}$ d) $\frac{2}{3}$

38. It $x+y\le 2, x\ge 0, y\ge 0$ the point at which maximum value of 3x + 2y attained will be

a) (0, 1) b) $\left(\frac{1}{2},\frac{1}{2}\right)$ c) (0, 2) d) (2, 0)

39. If $\tan\left(\frac{\alpha\pi}{4}\right)=\cot\left(\frac{\beta\pi}{4}\right)$ then

a) $\alpha+\beta=0$ b) $\alpha+\beta=2n$

c) $\alpha+\beta=2n+1$ d) $\alpha+\beta=2(2n+1)\forall$ n is an integer

40. If $\sin x+\cos x=\frac{1}{5}$ then tan 2x is

a) $\frac{25}{17}$ b) $\frac{24}{7}$ c) $\frac{7}{25}$ d) $\frac{25}{7}$

41. If $\left|\frac{z-25}{z-1}\right|=5$ find the value of |z|

a) 3 b) 4 c) 5 d) 6

42. If $y=f(x)=\frac{x+2}{x-1}$ then

a) $x=f(y)$ b) $f(1)=3$

c) y increases with x for x < 1 d) f is a rational function of x

43. The set A = {x : |2x + 3| < 7} is equal to the set

a) B = {x : –3 < x < 7 b) C = {x : –13 < 2x < 4}

c) D = {x : 0 < x + 5 < 7} d) E : {x : –7 < x < 7}

44. How many numbers of 6 digits can be formed from the digits of the numbers 112233?

a) 30 b) 60 c) 90 d) 120

45. If in the expansion of $(1+x)^{21}$, the coefficients of x^r and x^{r+1} be equal then r is equal to

a) 9 b) 10 c) 11 d) 12

46. If sum of an infinite geometric serves $\frac{4}{3}$ and its 1st term is $\frac{3}{4}$ then its common ratio is

a) $\frac{7}{16}$ b) $\frac{9}{16}$ c) $\frac{1}{9}$ d) $\frac{7}{9}$

47. The image of the origin with reference to the line 4x + 3y – 25 = 0 is

a) (–8, 6) b) (8, 6) c) (–3, 4) d) (8, –6)

48. The equation of the circle touching x = 0, y = 0 and x = 4 is

a) $x^2 + y^2 – 4x – 4y + 16 = 0$ b) $x^2 + y^2 – 8x – 8y + 16 = 0$

c) $x^2 + y^2 + 4x + 4y – 4 = 0$ d) $x^2 + y^2 – 4x – 4y + 4 = 0$

49. The vertex of the parabola $x^2 + 2y = 8x – 7$ is

a) $\left(\frac{9}{2},0\right)$ b) $\left(4,\frac{9}{2}\right)$ c) $\left(2,\frac{9}{2}\right)$ d) $\left(4,\frac{7}{2}\right)$

50. The mean and variance of n observations $x_1, x_2, \ldots x_n$ are 5 and o respectively. If $\sum_{i=1} x_i^2 = 400$ then the value of n is equal to

a) 80 b) 25 c) 20 d) 16

51. Which of the following is not true

a) Differentiability $\Rightarrow$ continuity b) continuity $\neq$ Differentiability

c) not continuous $\Rightarrow$ not differentiable d) continuous $\Rightarrow$ Differentiability

52. If $f(x)=\begin{cases}\dfrac{K\cos x}{\pi-2x} & x\neq 0\\ 3 & :x=0\end{cases}$ is continuous at x = 0 then the value of k is

a) $\frac{3\pi}{10}$ b) $\frac{2\pi}{10}$ c) 6 d) $\frac{1}{6}$

53. Which are of the following is not correct for the features of logarithmic function given by $f(x)=\log_e^x$

a) The domain of the function is the set of all positive real numbers
b) The range of the function is the set of all positive real numbers
c) For every positive values of x the function is very close to ∞
d) The point (–1, 0) is always on the graph of the function

54. If $y = (\sin^{-1} x)^2$ then $(1 - x^2) y_2 - xy_1 =$

a) 0 b) 1 c) 4 c) 2

55. If $f(x) = x^3 - 4x$ in $-2 \le x \le 2$ and $g(x) = x^2$ then consider the statements

(a) f(x) and g(x) satisfy mean value theorem
(b) f(x) and g(x) both satisfy Rolle's theorem
(c) only f(x) satisfies Rolle's theorem of these statements

a) (a) alone is correct b) (a) and (c) are correct
c) (a) and (b) are correct d) none is correct

56. If $y=(1+x)(1+x^2)(1+x^4)(1+x^8)(1+x^{16})$ then $\frac{dy}{dx}$ at x = 0 is

a) 1 b) 2 c) 3 d) 4

57. Which of the following is not a correct statement

a) $\sqrt{5}$ is a rational number b) $\sqrt{2}$ is a irrationals
c) Mathematics is interesting d) The pen is dark

58. The point of the curve $y^2 = x$ where the tangent makes an angle of $\frac{\pi}{4}$ with x-axis is

a) $\left(\frac{1}{2},\frac{1}{4}\right)$ b) $\left(\frac{1}{4},\frac{1}{2}\right)$ c) (4, 2) d) (1, 1)

59. $\lim\limits_{x\to\infty}\left(\dfrac{x^2+5x+3}{x^2+x+3}\right)^x =$

a) e^5 b) e^4 c) e^2 d) e^1

60. If y is a function of x and log (x + y) = 2xy then $y^1(0) =$

a) 1 b) –1 c) 2 d) 0