COMMON ENTRANCE TEST – 2017

DATE	SUBJECT	TIME
02-05-2017	MATHEMATICS	2.30 pm to 3.50 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
	XXXXXX

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 the **2ⁿᵈ bell i.e., after 2.30 pm.**

3. The Version Code / Serial Number of this question booklet should be entered on the OMR Answer Sheet and the respective circles should also be shaded completely.

4. Compulsorily affix the complete signature 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 **3ʳᵈ Bell rings at 2.40 pm,** till then;

   - Do not remove the seal 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 distracters. (Four different options / choices.)

2. After the 3ʳᵈ Bell is rung at 2.40 pm, remove the seal on the right hand side 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 it replaced immediately by complete test booklet by showing it to Room Invigilator. Read each item 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 OMR answer sheet.**

   Correct Method of shading the circles on the OMR Answer Sheet is :

4. 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.

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 3.50 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 the top sheet (KEA 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 year.

10. In case of any discrepancy in the English and Kannada versions, the English version will be taken as final.

1. If A and B are finite sets and $A \subset B$, then

(A) $n(A \cup B) = n(A)$ (B) $n(A \cap B) = n(B)$

(C) $n(A \cup B) = n(B)$ (D) $n(A \cap B) = \phi$

Question Id : 1

2. The value of
$\cos^2 45° - \sin^2 15°$ is

(A) $\dfrac{\sqrt{3}}{2}$ (B) $\dfrac{\sqrt{3}}{4}$

(C) $\dfrac{\sqrt{3}+1}{2\sqrt{2}}$ (D) $\dfrac{\sqrt{3}-1}{2\sqrt{2}}$

Question Id : 2

3. $3 + 5 + 7 + \ldots$ to n term is

(A) $n(n + 2)$ (B) $n(n - 2)$

(C) n^2 (D) $(n + 1)^2$

Question Id : 3

4. If $\left(\dfrac{1+i}{1-i}\right)^m = 1$, then the least positive integral value of m is

(A) 2   (B) 3

(C) 4   (D) 1

Question Id : 4

5. If $|x - 2| \le 1$, then

(A) $x \in [1,3]$ (B) $x \in (1,3)$

(C) $x \in [-1,3)$ (D) $x \in (-1,3)$

Question Id : 5

6. If ${}^nC_{12} = {}^nC_8$ then n is equal to

(A) 26   (B) 12

(C) 6   (D) 20

Question Id : 6

7. The total number of terms in the expansion of $(x+a)^{47} - (x-a)^{47}$ after simplification is

(A) 24   (B) 47

(C) 48   (D) 96

Question Id : 7

8. Equation of line passing through the point $(1, 2)$ and perpendicular to the line $y = 3x - 1$ is

(A) $x + 3y - 7 = 0$ (B) $x + 3y + 7 = 0$

(C) $x + 3y = 0$ (D) $x - 3y = 0$

Question Id : 8

9. The eccentricity of the ellipse $\dfrac{x^2}{36} + \dfrac{y^2}{16} = 1$ is

(A) $\dfrac{2\sqrt{5}}{6}$ (B) $\dfrac{2\sqrt{5}}{4}$

(C) $\dfrac{2\sqrt{13}}{6}$ (D) $\dfrac{2\sqrt{13}}{4}$

Question Id : 9

10. The perpendicular distance of the point $P(6, 7, 8)$ from XY-plane is

(A) 8   (B) 7

(C) 6   (D) 5

Question Id : 10

11. The value of $\displaystyle\lim_{\theta \to 0} \dfrac{1 - \cos 4\theta}{1 - \cos 6\theta}$ is

(A) 4/9   (B) 9/4

(C) 9/3   (D) 3/4

Question Id : 11

12. The contrapositive statement of the statement "If x is prime number, then x is odd" is

(A) If x is not a prime number, then x is not odd

(B) If x is a prime number, then x is not odd.

(C) If x is not a prime number, then x is odd.

(D) If x is not odd, then x is not a prime number.

Question Id : 12

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8. $(1, 2)$ ಬಿಂದುವಿನ ಮೂಲಕ ಹಾಯ್ದುಹೋಗುವ ಮತ್ತು $y = 3x - 1$ ಸರಳ ರೇಖೆಗೆ ಲಂಬವಾಗಿರುವ ಸರಳ ರೇಖೆಯ ಸಮೀಕರಣವು

(A) $x + 3y - 7 = 0$ (B) $x + 3y + 7 = 0$

(C) $x + 3y = 0$ (D) $x - 3y = 0$

Question Id : 8

9. ದೀರ್ಘವೃತ್ತ $\dfrac{x^2}{36} + \dfrac{y^2}{16} = 1$ ಉತ್ಕೇಂದ್ರದ ಬೆಲೆ

(A) $\dfrac{2\sqrt{5}}{6}$ (B) $\dfrac{2\sqrt{5}}{4}$

(C) $\dfrac{2\sqrt{13}}{6}$ (D) $\dfrac{2\sqrt{13}}{4}$

Question Id : 9

10. XY ಸಮತಲದಿಂದ $P(6, 7, 8)$ ಬಿಂದುವಿನ ಲಂಬದೂರದ ಬೆಲೆ

(A) 8   (B) 7

(C) 6   (D) 5

Question Id : 10

11. $\displaystyle\lim_{\theta \to 0} \dfrac{1 - \cos 4\theta}{1 - \cos 6\theta}$ ದ ಬೆಲೆಯು

(A) $4/9$ (B) $9/4$

(C) $9/3$ (D) $3/4$

Question Id : 11

12. "x ಒಂದು ಅವಿಭಾಜ್ಯ ಸಂಖ್ಯೆ ಆದರೆ ಆಗ x ಒಂದು ಬೆಸ ಸಂಖ್ಯೆ" ಎನ್ನುವ ನಿಬಂಧಿತ ಹೇಳಿಕೆಯ ಪ್ರತಿಧನ ಹೇಳಿಕೆ

(A) x ಒಂದು ಅವಿಭಾಜ್ಯ ಸಂಖ್ಯೆಯಲ್ಲದಾಗ x ಒಂದು ಬೆಸ ಸಂಖ್ಯೆಯಲ್ಲ

(B) x ಒಂದು ಅವಿಭಾಜ್ಯ ಯಾದಾಗ x ಒಂದು ಬೆಸ ಸಂಖ್ಯೆಯಲ್ಲ

(C) x ಒಂದು ಅವಿಭಾಜ್ಯ ಸಂಖ್ಯೆಯಲ್ಲದಾಗ x ಒಂದು ಬೆಸ ಸಂಖ್ಯೆ

(D) x ಒಂದು ಬೆಸ ಸಂಖ್ಯೆಯಲ್ಲದಾಗ x ಒಂದು ಅವಿಭಾಜ್ಯ ಸಂಖ್ಯೆಯಲ್ಲ

Question Id : 12

13. If coefficient of variation is 60 and standard deviation is 24, then Arithmetic mean is

(A) 40   (B) $7/20$

(C) $20/7$ (D) $1/40$

14. The range of the function $f(x) = \sqrt{9-x^2}$ is

(A) $(0, 3)$ (B) $[0, 3]$

(C) $(0, 3]$ (D) $[0, 3)$

15. Let $f : R \rightarrow R$ be defined by $f(x) = x^4$, then

(A) f is one-one and onto

(B) f may be one-one and onto

(C) f is one-one but not onto

(D) f is neither one-one nor onto

16. The range of $\sec^{-1}x$ is

(A) $\left[\dfrac{-\pi}{2}, \dfrac{\pi}{2}\right]$ (B) $\left(\dfrac{-\pi}{2}, \dfrac{\pi}{2}\right)$

(C) $[0, \pi]$ (D) $[0, \pi] - \left\{\dfrac{\pi}{2}\right\}$

17. If $\tan^{-1}x + \tan^{-1}y = \dfrac{4\pi}{5}$, then $\cot^{-1}x + \cot^{-1}y$ is equal to

(A) π (B) $\dfrac{\pi}{5}$

(C) $\dfrac{2\pi}{5}$ (D) $\dfrac{3\pi}{5}$

18. If $f(x) = 8x^3$, $g(x) = x^{1/3}$, then $fog\,(x)$ is

(A) $8x$ (B) $8^3 x$

(C) $(8x)^{1/3}$ (D) $8x^3$

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13. ಒಂದು ದತ್ತಾಂಶಗಳ ಮಾರ್ಪಿನ ಗುಣಾಂಕ 6 0 ಮತ್ತು ಮಾನಕ ವಿಚಲನೆ 24 ಆದಾಗ ಆದರ ಮದ್ಯಾಂಕದ ಬೆಲೆ

(A) 40 (B) $7/20$

(C) $20/7$ (D) $1/40$

14. $f(x) = \sqrt{9-x^2}$ ಉತ್ಪನ್ನದ ಬಿಂಬಗಣವು

(A) $(0, 3)$ (B) $[0, 3]$

(C) $(0, 3]$ (D) $[0, 3)$

15. $f : R \rightarrow R$ ಉತ್ಪನ್ನವು $f(x) = x^4$ ಎಂದು ವ್ಯಾಖ್ಯಾನಿಸಲ್ಪಟ್ಟಾಗ

(A) f ಒಂದು-ಒಂದು ಮತ್ತು ಮೇಲಣ ಉತ್ಪನ್ನವಾಗಿರುತ್ತದೆ

(B) f ಒಂದು-ಒಂದು ಮತ್ತು ಮೇಲಣ ಉತ್ಪನ್ನವಾಗಬಹುದು

(C) f ಒಂದು-ಒಂದು ಆದರೆ ಮೇಲಣ ಉತ್ಪನ್ನವಲ್ಲ

(D) f ಒಂದು-ಒಂದು ಅಲ್ಲ ಮತ್ತು ಮೇಲಣವೂ ಅಲ್ಲ

16. $\sec^{-1}x$ ಉತ್ಪನ್ನದ ಬಿಂಬಗಣವು

(A) $\left[\dfrac{-\pi}{2}, \dfrac{\pi}{2}\right]$ (B) $\left(\dfrac{-\pi}{2}, \dfrac{\pi}{2}\right)$

(C) $[0, \pi]$ (D) $[0, \pi] - \left\{\dfrac{\pi}{2}\right\}$

17. $\tan^{-1}x + \tan^{-1}y = \dfrac{4\pi}{5}$ ಆದರೆ $\cot^{-1}x + \cot^{-1}y$ ದ ಬೆಲೆ

(A) π (B) $\dfrac{\pi}{5}$

(C) $\dfrac{2\pi}{5}$ (D) $\dfrac{3\pi}{5}$

18. $f(x) = 8x^3$, $g(x) = x^{1/3}$ ಆದರೆ $fog\,(x)$ ದ ಬೆಲೆ

(A) $8x$ (B) $8^3 x$

(C) $(8x)^{1/3}$ (D) $8x^3$

19. If $A = \dfrac{1}{\pi}\begin{bmatrix} \sin^{-1}(\pi x) & \tan^{-1}\left(\dfrac{x}{\pi}\right) \\ \sin^{-1}\left(\dfrac{x}{\pi}\right) & \cot^{-1}(\pi x) \end{bmatrix}$,

$B = \begin{bmatrix} -\cos^{-1}(\pi x) & \tan^{-1}\left(\dfrac{x}{\pi}\right) \\ \sin^{-1}\left(\dfrac{x}{\pi}\right) & -\tan^{-1}(\pi x) \end{bmatrix}$ then A - B is equal to

(A) I (B) 0

(C) 2I (D) $\dfrac{1}{2}$ I

20. If a matrix A is both symmetric and skew symmetric, then
(A) A is diagonal matrix
(B) A is a zero matrix
(C) A is scalar matrix (D) A is square matrix

21. If $2\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$, then the value of x and y are

(A) $x = 3,\quad y = 3$

(B) $x = -3,\quad y = 3$

(C) $x = 3,\quad y = -3$

(D) $x = -3,\quad y = -3$

22. Binary operation * on R - {-1} defined by $a * b = \dfrac{a}{b+1}$ is
(A) * is associative and commutative
(B) * is associative but not commutative
(C) * is neither associative nor commutative
(D) * is commutative but not associative

23. If $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ then x is equal to

(A) 2   (B) 4

(C) 8   (D) $\pm 2\sqrt{2}$

Question Id : 23

23. $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ ಆದಾಗ x ನ ಬೆಲೆಯು

(A) 2   (B) 4

(C) 8   (D) $\pm 2\sqrt{2}$

Question Id : 23

24. If A is a square matrix of order 3×3, then $|KA|$ is equal to

(A) $K|A|$ (B) $K^2|A|$

(C) $K^3|A|$ (D) $3K|A|$

Question Id : 24

24. A ಯು 3×3 ದರ್ಜೆಯ ವರ್ಗ ಮಾತೃಕೆಯಾದಾಗ $|KA|$ ಮಾತೃಕೆಯ ಬೆಲೆಯು

(A) $K|A|$ (B) $K^2|A|$

(C) $K^3|A|$ (D) $3K|A|$

Question Id : 24

25. The area of triangle with vertices $(K, 0)$, $(4, 0)$, $(0, 2)$ is 4 square units, then value of K is

(A) 0 or 8   (B) 0 or – 8

(C) 0   (D) 8

Question Id : 25

25. $(K, 0), (4, 0), (0, 2)$ ಶೃಂಗ ಬಿಂದುಗಳನ್ನಾಗಿ ಹೊಂದಿರುವ ತ್ರಿಭುಜದ ಕ್ಷೇತ್ರಫಲ 4 ಚದರ ಮಾನಗಳಾದರೆ K ದ ಬೆಲೆಯು

(A) 0 ಅಥವಾ 8   (B) 0 ಅಥವಾ – 8

(C) 0   (D) 8

Question Id : 25

26. Let $\Delta = \begin{vmatrix} Ax & x^2 & 1 \\ By & y^2 & 1 \\ Cz & z^2 & 1 \end{vmatrix}$ and

$\Delta_1 = \begin{vmatrix} A & B & C \\ x & y & z \\ zy & zx & xy \end{vmatrix}$ then

(A) $\Delta_1 = -\Delta$ (B) $\Delta_1 = \Delta$

(C) $\Delta_1 \neq \Delta$ (D) $\Delta_1 = 2\Delta$

Question Id : 26

26. $\Delta = \begin{vmatrix} Ax & x^2 & 1 \\ By & y^2 & 1 \\ Cz & z^2 & 1 \end{vmatrix}$ ಮತ್ತು

$\Delta_1 = \begin{vmatrix} A & B & C \\ x & y & z \\ zy & zx & xy \end{vmatrix}$ ಆದರೆ

(A) $\Delta_1 = -\Delta$ (B) $\Delta_1 = \Delta$

(C) $\Delta_1 \neq \Delta$ (D) $\Delta_1 = 2\Delta$

Question Id : 26

27. If $f(x) = \begin{cases} Kx^2 & \text{if } x \leq 2 \\ 3 & \text{if } x > 2 \end{cases}$ is continuous at $x = 2$, then the value of K is

(A) 3   (B) 4

(C) 3/4   (D) 4/3

Question Id : 27

27. $f(x) = \begin{cases} Kx^2 & \text{if } x \leq 2 \\ 3 & \text{if } x > 2 \end{cases}$ ವ್ಯಾಖ್ಯಾನಿಸಿದ ಉತ್ಪನ್ನವು $x = 2$ ಬಿಂದುವಿನಲ್ಲಿ ಅವಿಚ್ಛಿನ್ನವಾದಾಗ K ದ ಬೆಲೆಯು

(A) 3   (B) 4

(C) 3/4   (D) 4/3

Question Id : 27

28. The value of C in Mean value theorem for the function $f(x) = x^2$ in $[2, 4]$ is

(A) 3 (B) 2

(C) 4 (D) 7/2

Question Id : 28

28. $f(x) = x^2$ ಉತ್ಪನ್ನವು $[2, \ 4]$ ಯಲ್ಲಿ ಮದ್ಯಮ ಮೌಲ್ಯಪ್ರಮೇಯದ ಪ್ರಕಾರ C ದ ಬೆಲೆಯು

(A) 3 (B) 2

(C) 4 (D) 7/2

Question Id : 28

29. The point on the curve $y^2 = x$ where the tangent makes an angle of $\pi/4$ with X-axis is

(A) $\left(\dfrac{1}{2}, \dfrac{1}{4} \right)$ (B) $\left(\dfrac{1}{4}, \dfrac{1}{2} \right)$

(C) $(4, 2)$ (D) $(1, 1)$

Question Id : 29

29. $y^2 = x$ ವಕ್ರರೇಖೆಯ ಮೇಲೆ ಯಾವ ಬಿಂದುವಿನಲ್ಲಿ ಎಳೆದ ಸ್ಪರ್ಶಕವು X ಅಕ್ಷದೊಂದಿಗೆ ಮಾಡುವ ಕೋನವು $\pi/4$ ಆಗಿರುತ್ತದೆ.

(A) $\left(\dfrac{1}{2}, \dfrac{1}{4} \right)$ (B) $\left(\dfrac{1}{4}, \dfrac{1}{2} \right)$

(C) $(4, 2)$ (D) $(1, 1)$

Question Id : 29

30. The function $f(x) = x^2 + 2x - 5$ is strictly increasing in the interval

(A) $(-1, \infty)$ (B) $(-\infty, -1)$

(C) $[-1, \infty)$ (D) $(-\infty, -1]$

Question Id : 30

30. $f(x) = x^2 + 2x - 5$ ನಿರ್ದಿಷ್ಟ ವೃದ್ಧಿಸುವ ಉತ್ಪನ್ನದ ಅವಧಿಯು

(A) $(-1, \infty)$ (B) $(-\infty, -1)$

(C) $[-1, \infty)$ (D) $(-\infty, -1]$

Question Id : 30

31. The rate of change of volume of a sphere with respect to its surface area when the radius is 4 cm is

(A) $4 \, cm^3 / cm^2$ (B) $2 \, cm^3 / cm^2$

(C) $6 \, cm^3 / cm^2$ (D) $8 \, cm^3 / cm^2$

Question Id : 31

31. ಗೋಳದ ತ್ರಿಜ್ಯವು 4 cm ಆದಾಗ ಗೋಳದ ಮೇಲ್ಮೈ ವಿಸ್ತೀರ್ಣಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಗೋಳದ ಘನಫಲದ ದರದ ಬೆಲೆ

(A) $4 \, cm^3 / cm^2$ (B) $2 \, cm^3 / cm^2$

(C) $6 \, cm^3 / cm^2$ (D) $8 \, cm^3 / cm^2$

Question Id : 31

32. If $y = \tan^{-1} \left(\dfrac{\sin x + \cos x}{\cos x - \sin x} \right)$, then $\dfrac{dy}{dx}$ is equal to

(A) 1/2 (B) $\pi/4$

(C) 0 (D) 1

Question Id : 32

32. $y = \tan^{-1} \left(\dfrac{\sin x + \cos x}{\cos x - \sin x} \right)$ ಆದರೆ $\dfrac{dy}{dx}$ ದ ಬೆಲೆ

(A) 1/2 (B) $\pi/4$

(C) 0 (D) 1

Question Id : 32

33.

If $y = \begin{vmatrix} f(x) & g(x) & h(x) \\ 1 & m & n \\ a & b & c \end{vmatrix}$, then $\dfrac{dy}{dx}$ is equal to

(A) $\begin{vmatrix} f'(x) & g'(x) & h'(x) \\ 1 & m & n \\ a & b & c \end{vmatrix}$

(B) $\begin{vmatrix} 1 & m & n \\ f'(x) & g'(x) & h'(x) \\ a & b & c \end{vmatrix}$

(C) $\begin{vmatrix} f'(x) & 1 & a \\ g'(x) & m & b \\ h'(x) & n & c \end{vmatrix}$

(D) $\begin{vmatrix} 1 & m & n \\ a & b & c \\ f'(x) & g'(x) & h'(x) \end{vmatrix}$

Question Id : 33

34. If $\sin x = \dfrac{2t}{1+t^2}, \tan y = \dfrac{2t}{1-t^2}$, then $\dfrac{dy}{dx}$ is equal to

(A) 1   (B) 0

(C) – 1   (D) 2

Question Id : 34

35. The derivative of $\cos^{-1}(2x^2 - 1)$ w.r.t $\cos^{-1}x$ is

(A) 2

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

(C) $\dfrac{2}{x}$

(D) $1 - x^2$

Question Id : 35

36. If $y = \log(\log x)$ then $\dfrac{d^2 y}{dx^2}$ is equal to

(A) $\dfrac{-(1+\log x)}{(x \log x)^2}$

(B) $\dfrac{-(1+\log x)}{x^2 \log x}$

(C) $\dfrac{(1+\log x)}{(x \log x)^2}$

(D) $\dfrac{(1+\log x)}{x^2 \log x}$

37. $\displaystyle\int \dfrac{(x+3)e^x}{(x+4)^2}\, dx$ is equal to

(A) $\dfrac{1}{(x+4)^2} + C$

(B) $\dfrac{e^x}{(x+4)^2} + C$

(C) $\dfrac{e^x}{(x+4)} + C$

(D) $\dfrac{e^x}{(x+3)} + C$

38. $\displaystyle\int \dfrac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta}\, dx$ is equal to

(A) $2(\sin x + x \cos \theta) + C$

(B) $2(\sin x - x \cos \theta) + C$

(C) $2(\sin x + 2x \cos \theta) + C$

(D) $2(\sin x - 2x \cos \theta) + C$

39. $\int \sqrt{x^2 + 2x + 5}\ dx$ is equal to

(A) $\dfrac{1}{2}(x+1)\sqrt{x^2+2x+5} + 2\log \left|x+1+\sqrt{x^2+2x+5}\right| + C$

(B) $(x+1)\sqrt{x^2+2x+5} + 2\log \left|x+1+\sqrt{x^2+2x+5}\right| + C$

(C) $(x+1)\sqrt{x^2+2x+5} - 2\log \left|x+1+\sqrt{x^2+2x+5}\right| + C$

(D) $(x+1)\sqrt{x^2+2x+5} + \dfrac{1}{2}\log \left|x+1+\sqrt{x^2+2x+5}\right| + C$

Question Id : 39

40. $\int_0^{\pi/2} \dfrac{\tan^7 x}{\cot^7 x + \tan^7 x}\ dx$ is equal to

(A) $\dfrac{\pi}{2}$ (B) $\dfrac{\pi}{4}$

(C) $\dfrac{\pi}{6}$ (D) $\dfrac{\pi}{3}$

Question Id : 40

41. $\int_{-5}^{5} |x+2|\ dx$ is equal to

(A) 29   (B) 28

(C) 27   (D) 30

Question Id : 41

42. $\int_{-\pi/2}^{\pi/2} \dfrac{dx}{e^{\sin x}+1}$ is equal to

(A) 0   (B) 1

(C) $-\dfrac{\pi}{2}$ (D) $\dfrac{\pi}{2}$

Question Id : 42

43.
$$\int_0^{\pi/2} \frac{1}{a^2 \cdot \sin^2 x + b^2 \cdot \cos^2 x}\ dx$$ is equal to

(A) $\dfrac{\pi a}{4b}$ (B) $\dfrac{\pi a}{2b}$

(C) $\dfrac{\pi b}{4a}$ (D) $\dfrac{\pi}{2ab}$

Question Id : 43

44. The area of the region bounded by the curve $y = x^2$ and the line y = 16 is

(A) $\dfrac{32}{3}$ sq. units   (B) $\dfrac{256}{3}$ sq. units

(C) $\dfrac{64}{3}$ sq. units   (D) $\dfrac{128}{3}$ sq. units

Question Id : 44

45. Area of the region bounded by the curve $y = \cos x, x = 0$ and $x = \pi$ is

(A) 2 sq. units   (B) 4 sq. units

(C) 3 sq. units   (D) 1 sq. unit

Question Id : 45

46. The degree of the differential equation $\left[1 + \left(\dfrac{dy}{dx}\right)^2\right]^2 = \dfrac{d^2y}{dx^2}$ is

(A) 1   (B) 2

(C) 3   (D) 4

Question Id : 46

47. General solution of differential equation $\dfrac{dy}{dx} + y = 1\ (y \neq 1)$ is

(A) $\log\left|\dfrac{1}{1-y}\right| = x + C$ (B) $\log|1 - y| = x + C$

(C) $\log|1 + y| = x + C$

(D) $\log\left|\dfrac{1}{1-y}\right| = -x + C$

Question Id : 47

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48. The integrating factor of the differential equation $x \cdot \dfrac{dy}{dx} + 2y = x^2$ is $(x \neq 0)$

(A) x^2

(B) $\log|x|$

(C) $e^{\log x}$

(D) x

49. If $\vec{a} = 2\hat{i} + \lambda\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}$ are orthogonal, then value of λ is

(A) 0

(B) 1

(C) $\dfrac{3}{2}$

(D) $-\dfrac{5}{2}$

50. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{o}$, then the value of $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ is equal to

(A) 1

(B) 3

(C) $-\dfrac{3}{2}$

(D) $\dfrac{3}{2}$

51. If $\vec{a}$ & $\vec{b}$ are unit vectors, then angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}\,\vec{a} - \vec{b}$ to be unit vector is

(A) 30°

(B) 45°

(C) 60°

(D) 90°

52. Reflexion of the point (α, β, γ) in XY plane is

(A) $(\alpha, \beta, 0)$

(B) $(0, 0, \gamma)$

(C) $(-\alpha, -\beta, \gamma)$

(D) $(\alpha, \beta, -\gamma)$

53. The plane $2x - 3y + 6z - 11 = 0$ makes an angle $\sin^{-1}(\alpha)$ with X-axis. The value of α is equal to

(A) $\dfrac{\sqrt{3}}{2}$

(B) $\dfrac{\sqrt{2}}{3}$

(C) $\dfrac{2}{7}$

(D) $\dfrac{3}{7}$

54. The distance of the point (–2, 4, –5) from the line $\dfrac{x+3}{3} = \dfrac{y-4}{5} = \dfrac{z+8}{6}$ is

(A) $\dfrac{\sqrt{37}}{10}$

(B) $\sqrt{\dfrac{37}{10}}$

(C) $\dfrac{37}{\sqrt{10}}$

(D) $\dfrac{37}{10}$

55. A box has 100 pens of which 10 are defective. The probability that out of a sample of 5 pens drawn one by one with replacement and atmost one is defective is

(A) $\dfrac{9}{10}$

(B) $\dfrac{1}{2}\left(\dfrac{9}{10}\right)^4$

(C) $\left(\dfrac{9}{10}\right)^5 + \dfrac{1}{2}\left(\dfrac{9}{10}\right)^4$

(D) $\dfrac{1}{2}\left(\dfrac{9}{10}\right)^5$

56. Two events A and B will be independent if

(A) A and B are mutually exclusive

(B) $P(A' \cap B') = (1 - P(A))(1 - P(B))$

(C) $P(A) = P(B)$

(D) $P(A) + P(B) = 1$

53. X ಅಕ್ಷ ಮತ್ತು $2x - 3y + 6z - 11 = 0$ ಸಮತಲದ ನಡುವಿನ ಕೋನ $\sin^{-1}(\alpha)$ ಆದಾಗ α ದ ಬೆಲೆಯು

(A) $\dfrac{\sqrt{3}}{2}$

(B) $\dfrac{\sqrt{2}}{3}$

(C) $\dfrac{2}{7}$

(D) $\dfrac{3}{7}$

54. $\dfrac{x+3}{3} = \dfrac{y-4}{5} = \dfrac{z+8}{6}$ ಸರಳ ರೇಖೆಯಿಂದ (–2, 4, –5) ಬಿಂದುವಿನ ದೂರವು

(A) $\dfrac{\sqrt{37}}{10}$

(B) $\sqrt{\dfrac{37}{10}}$

(C) $\dfrac{37}{\sqrt{10}}$

(D) $\dfrac{37}{10}$

55. ಒಂದು ಪೆಟ್ಟಿಗೆಯಲ್ಲಿಯ 100 ಪೆನ್ನುಗಳಲ್ಲಿ 10 ದೋಷ ಪೂರಿತವಾಗಿವೆ. 5 ಪೆನ್ನುಗಳಿಂದ ಒಂದಾದ ಮೇಲೊಂದರಂತೆ ಬದಲಾವಣೆಗೆ ಒಳಪಟ್ಟು ಕನಿಷ್ಠ ಒಂದು ದೋಷಪೂರಿತ ಇರುವಂತೆ ಎತ್ತಿಕೊಳ್ಳುವ ಸಂಭವನೀಯತೆಯ ಬೆಲೆ

(A) $\dfrac{9}{10}$

(B) $\dfrac{1}{2}\left(\dfrac{9}{10}\right)^4$

(C) $\left(\dfrac{9}{10}\right)^5 + \dfrac{1}{2}\left(\dfrac{9}{10}\right)^4$

(D) $\dfrac{1}{2}\left(\dfrac{9}{10}\right)^5$

56. A ಮತ್ತು B ಎರಡು ಸ್ವತಂತ್ರ ಘಟನೆಗಳಾದರೆ ಆಗ

(A) A ಮತ್ತು B ಗಳು ಪರಸ್ಪರ ವ್ಯಾವರ್ತಕ ಘಟನೆಗಳು

(B) $P(A' \cap B') = (1 - P(A))(1 - P(B))$

(C) $P(A) = P(B)$

(D) $P(A) + P(B) = 1$

57. The probability distribution of X is

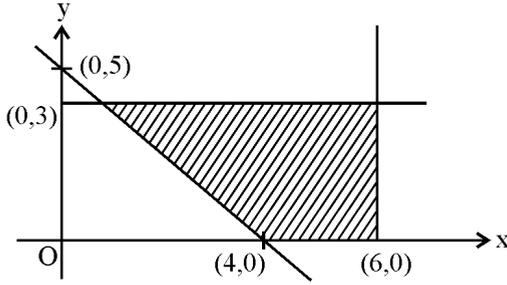| X	0	1	2	3
P(X)	0.3	k	2k	2k

The value of k is

(A) 0.14 (B) 0.3

(C) 0.7 (D) 1

58. The shaded region in the figure is the solution set of the inequations

(A) $5x + 4y \geq 20, x \leq 6, y \geq 3, x \geq 0, y \geq 0$

(B) $5x + 4y \leq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

(C) $5x + 4y \geq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

(D) $5x + 4y \geq 20, x \geq 6, y \leq 3, x \geq 0, y \geq 0$

59. If an LPP admits optimal solution at two consecutive vertices of a feasible region, then

(A) the required optimal solution is at the midpoint of the line joining two points.

(B) the optimal solution occurs at every point on the line joining these two points

(C) the LPP under consideration is not solvable

(D) the LPP under consideration must be reconstructed

60. $\int_{0.2}^{3.5} [x] \ dx$ is equal to

(A) 4 (B) 4.5

(C) 3.5 (D) 3

57. X ನ ಸಂಭವನೀಯತೆ ಹಂಚಿಕೆ

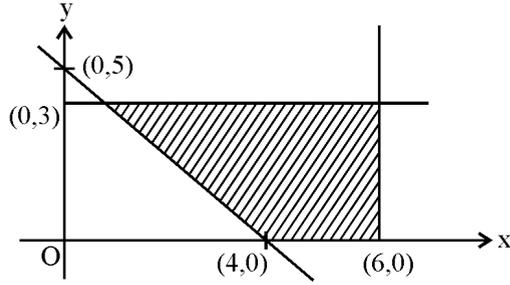| X	0	1	2	3
P(X)	0.3	k	2k	2k

ಆದಾಗ k ದ ಬೆಲೆಯು

(A) 0.14 (B) 0.3

(C) 0.7 (D) 1

58. ನಕ್ಷೆಯಲ್ಲಿ ಗುರುತಿಸಿದ ಭಾಗವು ಕೆಳಗಿನ ಯಾವ ಅಸಮತೆಗಳ ಪರಿಹಾರ ಗಣವಾಗಿರುತ್ತದೆ.

(A) $5x + 4y \geq 20, x \leq 6, y \geq 3, x \geq 0, y \geq 0$

(B) $5x + 4y \leq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

(C) $5x + 4y \geq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

(D) $5x + 4y \geq 20, x \geq 6, y \leq 3, x \geq 0, y \geq 0$

59. LPP ಯ ಸಂಭಾವ್ಯ ಪ್ರದೇಶದ ಎರಡು ಅನುಕ್ರಮ ಶೃಂಗಗಳ ಸೂಕ್ತ ಮೌಲ್ಯಗಳನ್ನು ಕೊಟ್ಟಾಗ

(A) ಬೇಕಾದ ಸೂಕ್ತ ಮೌಲ್ಯ ಪರಿಹಾರವು ಆ ಎರಡು ಬಿಂದುಗಳನ್ನು ಸೇರಿಸುವ ಸರಳ ರೇಖೆಯ ಮಧ್ಯ ಬಿಂದುವಾಗಿರುತ್ತದೆ.

(B) ಸೂಕ್ತ ಮೌಲ್ಯ ಪರಿಹಾರವು ಆ ಎರಡು ಬಿಂದುಗಳನ್ನು ಸೇರಿಸುವ ಸರಳ ರೇಖೆಯ ಮೇಲಿರುವ ಎಲ್ಲ ಬಿಂದುಗಳಾಗಿರುತ್ತವೆ.

(C) ತೆಗೆದುಕೊಂಡ LPP ಗೆ ಪರಿಹಾರವಿಲ್ಲ.

(D) ದತ್ತ LPP ಯನ್ನು ಮರು ರಚಿಸಬೇಕು.

60. $\int_{0.2}^{3.5} [x] \ dx$ ದ ಬೆಲೆಯು

(A) 4 (B) 4.5

(C) 3.5 (D) 3

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FINAL ANSWER KEYS - MATHEMATICS

MASTER QUESTION	MASTER KEY	MASTER QUESTION	MASTER KEY	MASTER QUESTION	MASTER KEY
Q -01	C	Q -21	A	Q -41	A
Q -02	B	Q -22	C	Q -42	D
Q -03	A	Q -23	D	Q -43	D
Q -04	C	Q -24	C	Q -44	B
Q -05	A	Q -25	A	Q -45	A
Q -06	D	Q -26	B	Q -46	A
Q -07	A	Q -27	C	Q -47	A
Q -08	A	Q -28	A	Q -48	A
Q -09	A	Q -29	B	Q -49	D
Q -10	A	Q -30	A	Q -50	C
Q -11	A	Q -31	B	Q -51	A
Q -12	D	Q -32	D	Q -52	D
Q -13	A	Q -33	ACD	Q -53	C
Q -14	B	Q -34	A	Q -54	B
Q -15	D	Q -35	A	Q -55	C
Q -16	D	Q -36	A	Q -56	B
Q -17	B	Q -37	C	Q -57	A
Q -18	A	Q -38	A	Q -58	C
Q -19	GRACE	Q -39	A	Q -59	B
Q -20	B	Q -40	B	Q -60	B