CUET UG - 2022
(CANDIDATE RESPONSE SHEET)

Paper/Subject	MATHEMATICS/APPLIED MATHEMATICS
Exam Date	21 Aug 2022
Exam Slot	1

Question ID:481311
Section Name:COMPULSORY
Question:

Let $z = px + qy$ be the objective function of LPP. The condition on p and q, so that the maximum of z occurs at both the points $(15, 15)$ and $(0, 20)$ of feasible region is :

A $\quad p = q$

B $\quad p = 2q$

C $\quad q = 2p$

D $\quad q = 3p$

Answer Given By Candidate:**A**

Question ID:481312
Section Name:COMPULSORY
Question:

The probability of 2 black kings, when red face cards are removed from 52 cards is :

A $\quad {}^4C_2 / {}^{52}C_2$

B $\quad {}^4C_2 / {}^{46}C_2$

C $\quad {}^2C_2 / {}^{52}C_2$

D $\quad {}^2C_2 / {}^{46}C_2$

Answer Given By Candidate:**B**

Question ID:481313
Section Name:COMPULSORY
Question:

If $2\,P(A) = P(B) = \dfrac{5}{13}$ and $P(A/B) = \dfrac{2}{5}$ then value of $P(A \cup B)$ is :

A $\quad \dfrac{11}{26}$

B

$\dfrac{9}{26}$

C $\dfrac{11}{13}$

D $\dfrac{11}{27}$

Answer Given By Candidate:**A**

Question ID:481314
Section Name:COMPULSORY
Question:
A random variable X has a probability distribution

$$P(X = x) = \begin{cases} k, & x = 0 \\ 2k, & x = 1 \\ 3k, & x = 2 \\ 0, & otherwise \end{cases}$$

where k is constant. The value of k is :

A $\dfrac{1}{5}$

B $\dfrac{1}{6}$

C   1

D   0

Answer Given By Candidate:**B**

Question ID:481315
Section Name:COMPULSORY
Question:
The solution of the differential equation $\dfrac{dy}{dx} = e^{x+y} + x^2 e^{y}$, is

A
$$e^{x} + e^{-y} + \dfrac{x^3}{3} + C = 0$$

B
$$e^{x} + e^{y} + \dfrac{x^3}{3} + C = 0$$

C
$$e^{x} - e^{y} + \dfrac{x^3}{3} + C = 0$$

D
$$e^{x} - e^{-y} + \dfrac{x^3}{3} + C = 0$$

Answer Given By Candidate:**B**

Question ID:481316
Section Name:COMPULSORY
Question:

A line, $y = x$ partition the circle $(x - a)^2 + y^2 = a^2$, $a > 0$, in two parts. The area of major segment is :

A $\dfrac{a^2}{4}(3\pi + 2)$

B $\dfrac{\pi a^2}{3}$

C $\dfrac{a^2}{9}$

D $\dfrac{a^2(\pi - 2)}{4}$

Answer Given By Candidate:**Not Attempted**

Question ID:481317
Section Name:COMPULSORY
Question:

The differential equation representing family of curves $y = ae^x + be^{-2x}$, when a and b are arbitrary constants is :

A $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} - 2y = 0$

B $\dfrac{d^2y}{dx^2} - \dfrac{dy}{dx} + 2y = 0$

C $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + y = 0$

D $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} - 6y = 0$

Answer Given By Candidate:**Not Attempted**

Question ID:481318
Section Name:COMPULSORY
Question:

If A is a square matrix of size 3 and $|A| = 3\sqrt{3}$, then value of λ for which $|\,2\lambda\ adj\,(3A)\,| = 1000$ is :

A

$$\frac{5}{9}$$

B $\frac{5}{81}$

C $\frac{5}{27}$

D $\frac{3}{7}$

Answer Given By Candidate:**Not Attempted**

Question ID:481319
Section Name:COMPULSORY
Question:

The seond derivative of $\sqrt{\frac{1-x^2}{1+x^2}}$ with respect to $\sqrt{\frac{1+x^2}{1-x^2}}$ is :

A $-\frac{1-x^2}{1+x^2}$

B $\frac{2x}{(1+x^2)^2}$

C $2\left(\frac{1-x^2}{1+x^2}\right)^{\frac{3}{2}}$

D $\frac{4x}{(1+x^2)^2}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813110
Section Name:COMPULSORY
Question:
The function $f(x) = -2x^2 + ax + 4$; $x \in [-1, 5]$ is strictly decreasing function if a lies in the interval :

A $(4, \infty)$

B $(-4, \infty)$

C $(-\infty, -4)$

D $(-\infty, -2)$

Answer Given By Candidate:**B**

Question ID:4813111
Section Name:COMPULSORY
Question:
If m and n are order and degree of differential equation

$$\sqrt{\frac{d^2y}{dx^2} + 1} = \left(\frac{dy}{dx} + y + x\right)^{\frac{1}{3}}, \text{ then } \frac{m}{n} \text{ is :}$$

A $\quad\dfrac{2}{3}$

B $\quad\dfrac{1}{3}$

C $\quad\dfrac{1}{6}$

D $\quad\dfrac{3}{2}$

Answer Given By Candidate:**B**

Question ID:4813112
Section Name:COMPULSORY
Question:
The number of all possible matrices of order 3×3 with diagonal elements as 0 or 1 or 2 and other elements being 2 or 3 are :

A 264

B 729

C 1728

D 4096

Answer Given By Candidate:**Not Attempted**

Question ID:4813113
Section Name:COMPULSORY
Question:
$$\int_2^5 (|x - 2| + |x - 3|)dx =$$

A 7

B 6

C 5

D 1

Answer Given By Candidate:**Not Attempted**

Question ID:4813114
Section Name:COMPULSORY
Question:

If $\int_0^1 \sqrt{x^2 + 8x + 17}\ dx = \alpha\sqrt{17} + \beta\sqrt{26} + \gamma \log\left(\dfrac{5+\sqrt{26}}{4+\sqrt{17}}\right)$, then value

of $\alpha + \beta + \gamma$ is :

A   0

B   1

C   −1

D   2

Answer Given By Candidate:**Not Attempted**

Question ID:4813115
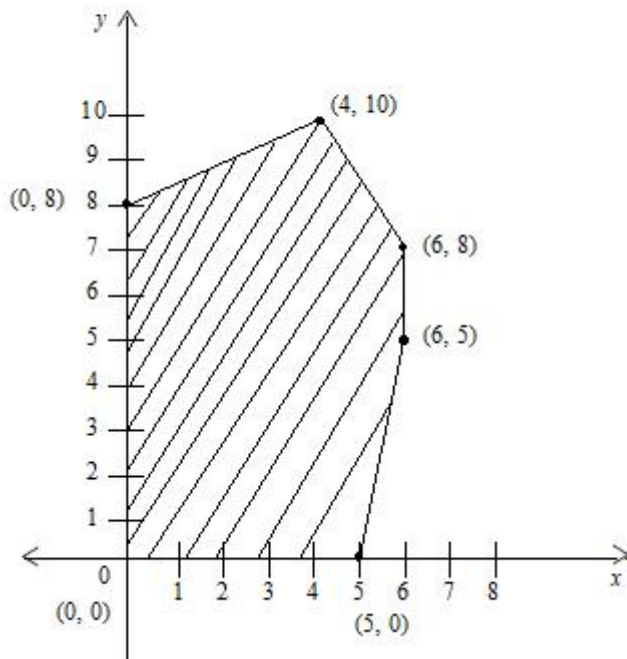**Section Name:**COMPULSORY
Question:

Area bounded by the curve $y = x^3$, x-axis and the line $x = -2$ and $x = 1$, is :

A   9

B $\dfrac{15}{8}$

C $\dfrac{15}{4}$

D $\dfrac{17}{4}$

Answer Given By Candidate:**C**

Question ID:4813151
Section Name:MATHEMATICS CORE

Question:

The feasible region for LPP is shown in figure below. If $z = 3x + 4y$ be the objective function, then maximum value of z occurs at :

A $(6,5)$

B $(6,8)$

C $(5,0)$

D $(4,10)$

Answer Given By Candidate:**D**

Question ID:4813152
Section Name:MATHEMATICS CORE
Question:

The line of intersection of two planes $x + y + z + 1 = 0$ and $2x + y - z - 6 = 0$ that pass through point $(0, \frac{5}{2}, -\frac{7}{2})$ is :

A $\vec{r} = (0, \frac{5}{2}, -\frac{7}{2}) + \lambda\,(2, -3, 1)$

B $\vec{r} = (2, -3, 1) + \mu\,(0, 5\ -7)$

C $\vec{r} = (1, -1,6) + \lambda\,(2, 3, 1)$

D $\vec{r} = (4, 1, 4) + \mu\,(2, -3, 1)$

Answer Given By Candidate:**A**

Question ID:4813153
Section Name:MATHEMATICS CORE

Question:

The vector $\vec{c}$ of length 5 units, satisfy $\vec{c} \times \vec{a} = \vec{b} \times \vec{c}$, where $\vec{a} = \hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = 2\hat{i} + \hat{j} - \hat{k}$, is:

A $5\left(\dfrac{\hat{i}}{\sqrt{3}} + \dfrac{\hat{j}}{\sqrt{3}} + \dfrac{\hat{k}}{\sqrt{3}}\right)$

B $5\hat{i}$

C $5\hat{j}$

D $5\hat{k}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813154
Section Name:MATHEMATICS CORE
Question:

$\displaystyle\int_{0}^{\pi} \dfrac{x}{1+|\cos x|}\, dx =$

A π

B $\dfrac{\pi}{2}$

C $\dfrac{3\pi}{4}$

D $\dfrac{5\pi}{6}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813155
Section Name:MATHEMATICS CORE
Question:

If A, B and C are mutually exclusive and exhaustive events and $2\,P(A) = 3\,P(B) = 4\,P(C)$, then the value of $P(A) + P(B)$ is equal to:

A $\dfrac{10}{13}$

B $\dfrac{7}{13}$

C $\dfrac{9}{13}$

D $\dfrac{1}{13}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813156
Section Name:MATHEMATICS CORE
Question:
In a binomial distribution, if expected number of successes is equal to the standard deviation of the distribution, then probability of no success in an experiment of 5 trials, is :

A $\left(\dfrac{5}{6}\right)^5$

B $\dfrac{5}{6^5}$

C $2 \times \left(\dfrac{5}{6}\right)^5$

D $\left(\dfrac{1}{6^5}\right)$

Answer Given By Candidate:**Not Attempted**

Question ID:4813157
Section Name:MATHEMATICS CORE
Question:
The equation of a plane which bisect normally, the line segment joining the points A(2,3,4) and B(4,5,8) is

A $2x + y + z = 19$

B $x + 2y + z = 19$

C $x + y + 2z = 19$

D $x - y + 2z = 19$

Answer Given By Candidate:**C**

Question ID:4813158
Section Name:MATHEMATICS CORE
Question:
$$\dfrac{\int_0^{100\pi} |\sin x|\, dx}{100} =$$

A 2

B 1

C 3

D 250

Answer Given By Candidate:**Not Attempted**

Question ID:4813159
Section Name:MATHEMATICS CORE
Question:

$\int \frac{sec^2x}{cosec^2x}\,dx$

A $\tan x + x + C$

B $\tan x - x + C$

C $\sec x + C$

D $\tan x + C$

Answer Given By Candidate:**B**

Question ID:4813160
Section Name:MATHEMATICS CORE
Question:

The foot of perpendicular from the point (2, 3, –8) to the line $\frac{4-x}{2} = \frac{y}{6} = \frac{1-z}{3}$

is :

A (2, 6, 2)

B (–2, 6, –2)

C (2, –6, 2)

D (2, 6, –2)

Answer Given By Candidate:**D**

Question ID:4813161
Section Name:MATHEMATICS CORE
Question:

If $\vec{a} = (1, -1, 1)$, $\vec{b} = (4, 6, 3)$ and $\vec{c} = (1, 1, -3)$ are position vector of three vertices of parallogram, then its fourth vertex is :

A (2, 0, –2)

B (5, 5, 4)

C (3, 7, 2)

D (–2, –6, –5)

Answer Given By Candidate:**A**

Question ID:4813162
Section Name:MATHEMATICS CORE

Question:

If $\left|\vec{a}\times\vec{b}\right|^2 + \left|\vec{a}.\vec{b}\right|^2 = 144$ and $|\vec{a}| = 4$ then $|\vec{b}|$ is :

A $\sqrt{128}$

B $\sqrt{56}$

C   3

D   5

Answer Given By Candidate:**Not Attempted**

Question ID:4813163
Section Name:MATHEMATICS CORE
Question:

The angle between pair of lines given by $\dfrac{x+3}{3} = \dfrac{y-1}{5} = \dfrac{z+3}{4}$ and

$\dfrac{x+1}{1} = \dfrac{y-4}{1} = \dfrac{z-5}{2}$ is :

A $\cos^{-1}\left(\dfrac{8\sqrt{3}}{15}\right)$

B $\cos^{-1}\left(\dfrac{16}{15\sqrt{3}}\right)$

C $\cos^{-1}\left(\dfrac{2}{5}\right)$

D $\dfrac{\pi}{2}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813164
Section Name:MATHEMATICS CORE
Question:
The integrating factor of the differential equation

$y\dfrac{dx}{dy} - 3x = y^3$ is :

A $\dfrac{1}{y^3}$

B y^3

C x^3

D $\dfrac{1}{x^3}$

Answer Given By Candidate:**D**

Question ID:4813165
Section Name:MATHEMATICS CORE
Question:

If $\int \dfrac{2x^2 + 3}{(x^2 + 1)(x^2 + 2)}\, dx = \lambda \tan^{-1} \dfrac{x}{\sqrt{2}} + \mu \tan^{-1} x + c$, where C is constant of integration, then value of is $\lambda^2 + \mu$:

A 7

B 5

C $\dfrac{3}{2}$

D $\dfrac{3}{4}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813166
Section Name:MATHEMATICS CORE
Question:

If $\int_0^{\frac{\pi}{4}} \tan^4 x\, dx = \alpha\pi - \beta$, then value of $\alpha + \beta$ is :

A $\dfrac{1}{12}$

B $\dfrac{11}{12}$

C $\dfrac{17}{12}$

D $\dfrac{19}{12}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813167
Section Name:MATHEMATICS CORE
Question:

The function $f(x) = \begin{cases} |x| + 3, & x \le -3 \\ -2x, & -3 < x < 3 \\ 6x + 2, & x \ge 3 \end{cases}$ is discontinuous at :

A $x = 0$

B $x = -3$

C $x = 3$

D $x = -2$

Answer Given By Candidate:**C**

Question ID:4813168
Section Name:MATHEMATICS CORE
Question:
The number of all possible non-zero matrices of order 4×2 with elements 0 or 3 is
:

A 512

B 1024

C 255

D 256

Answer Given By Candidate:**D**

Question ID:4813169
Section Name:MATHEMATICS CORE
Question:
If A is matrix of order 3×3 and A. adj. (A) + adj. (A). A = 8I, then the value of $|A^{-1}|$ is :

A $\dfrac{1}{2\sqrt{2}}$

B $\dfrac{1}{4}$

C $\dfrac{1}{8}$

D $\dfrac{1}{64}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813170
Section Name:MATHEMATICS CORE
Question:
If $\begin{vmatrix} 1 & 2-x & 0 \\ x & 3 & 4 \\ x & 4 & x^2 \end{vmatrix} = Ax^4 + Bx^3 + Cx^2 + Dx + E$, then value of E is :

A 16

B −16

C 13

D 0

Answer Given By Candidate:**B**

Question ID:4813171
Section Name:MATHEMATICS CORE
Question:

$$\begin{vmatrix} x & x+y & x+2y \\ x+2y & x & x+y \\ x+y & x+2y & x \end{vmatrix} =$$

A $9x^2\,(x+y)$

B $9y^2\,(x+y)$

C $3y^2\,(x+y)$

D $7x^2\,(x+y)$

Answer Given By Candidate:**B**

Question ID:4813172
Section Name:MATHEMATICS CORE
Question:

If A is square matrix of order 3, $|A| = 4$ and $|2\ \text{adj}.(3\text{adj}.(4A))| = 2^a.3^b$, then value of $a + b$ is :

A   48

B   41

C   16

D   12

Answer Given By Candidate:**Not Attempted**

Question ID:4813173
Section Name:MATHEMATICS CORE
Question:

Let A = {1, 2, 3, 4}. If a relation R on A is defined as R = {(1,1), (1,2) ,(2,3), (3,3), (2,1), (2,2), (3,2), (4,4)}, then R is :

    A. Reflexive
    B. Symmetric
    C. Transitive
    D. Equivalence

Choose the correct option from options given below:

A   A and B only

B   A and C only

C   B and C only

D   D only

Answer Given By Candidate:**D**

Question ID:4813174
Section Name:MATHEMATICS CORE
Question:

If $0 < x < 1$, then value of $\dfrac{\tan^{-1}\left(\dfrac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right)}{\sin^{-1}x}$, is

A $\dfrac{1}{4}$

B $\dfrac{2}{5}$

C $\dfrac{1}{2}$

D $\dfrac{3}{5}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813175
Section Name:MATHEMATICS CORE
Question:

The value of $\cos^{-1}\left(\cos\dfrac{4\pi}{3}\right)$ is :

A $\dfrac{4\pi}{3}$

B $\dfrac{\pi}{3}$

C $\dfrac{2\pi}{3}$

D $-\dfrac{\pi}{3}$

Answer Given By Candidate:**C**

Passage:

An Automobile company manufactures two variants of its new model, one is petrol and another diesel. The company has two manufacturing plants at Bhiwadi and at Secundarabad. The data of the first phase of making of the car models along with its production is given in the following table :-

Model	Plant		Total
	Bhiwadi (production in units)	Secundarabad (production in units)	
Petrol	1600	2800	4400
Diesel	1000	600	1600
Total	2600	3400	6000

After thorough quality checks the chances of finding any defect in the manufactured cars are as given in the table :-

Model	Plant	
	Bhiwadi	Secundarabad
Petrol	1.1%	0.99%
Diesel	0.32%	0.48%

Based on the above data, answer the questions.

Question ID:4813176
Section Name:MATHEMATICS CORE
Question:
A car is picked at random from the production units.
If the car is found to be a petrol variant then probability that it is defective is :

A   0.0281

B   0.0521

C   0.0103

D   0.0346

Answer Given By Candidate:**Not Attempted**

Question ID:4813177
Section Name:MATHEMATICS CORE
Question:
A car is picked at random from the production units.
If the car is found to be a diesel variant then the probability that it is defective is

A   0.0041

B   0.0038

C   0.0082

D   0.0025

Answer Given By Candidate:**Not Attempted**

Question ID:4813178
Section Name:MATHEMATICS CORE
Question:
A car is picked at random from the production units.
If the car is found to be defective and it was picked from Bhiwadi plant, then
probability of the car to be of petrol variant, is:

A $\dfrac{16}{30}$

B $\dfrac{11}{50}$

C $\dfrac{11}{15}$

D $\dfrac{11}{13}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813179
Section Name:MATHEMATICS CORE
Question:
A car is picked at random from the production units.
If the car is found to be a defective and it was picked from Secondarabad plant.
The probability that the car of diesel variant, is:

A $\dfrac{8}{85}$

B $\dfrac{77}{85}$

C $\dfrac{31}{35}$

D $\dfrac{24}{25}$

Answer Given By Candidate:**Not Attempted**

Question ID:4813180
Section Name:MATHEMATICS CORE

Question:
Based on the data given which of the following statements are correct ?

A. Bhiwadi plant has higher chances of making a defective car of petrol model than Secondarabad plant
B. Secondarabad plant has higher chances of making a defective car of petrol model than Bhiwadi plant
C. Bhiwadi plant has higher chances of making a defective car of diesel model than Secondarabad plant
D. Secondarabad plant has higher chances of making a defective car of diesel model than Bhiwadi plant

Choose the correct option from options give below:

A   B and C only

B   A and D only

C   B and D only

D   A and C only

Answer Given By Candidate:**Not Attempted**

Passage:
Suresh started a shoe company. He sells x number of shoes at a price of $(100 - x)$ each and the cost price of x shoes is $(2x^2 - 20x - 15)$.

Based on this information give answers to questions.

Question ID:4813181
Section Name:MATHEMATICS CORE
Question:
The selling price S(x) of x number of shoes is

A $2x^2 - 20x - 15$

B $100x - x^2$

C $100 - x^2$

D $100 - x$

Answer Given By Candidate:**Not Attempted**

Question ID:4813182
Section Name:MATHEMATICS CORE
Question:
If P(x) is profit function, then it will be

A $2x^2 - 20x - 15$

B $3x^2 - 120x - 15$

C $-3x^2 + 120x + 15$

D $2x^2 + 20x + 15$

Answer Given By Candidate:**Not Attempted**

Question ID:4813183
Section Name:MATHEMATICS CORE
Question:
If $P(x)$ is profit function then $P'(x)$ is

A $6x + 120$

B $6x - 120$

C $4x - 20$

D $-6x + 120$

Answer Given By Candidate:**Not Attempted**

Question ID:4813184
Section Name:MATHEMATICS CORE
Question:
The number of shoes will be sold to get maximum profit, is :

A   10

B   20

C   30

D   40

Answer Given By Candidate:**Not Attempted**

Question ID:4813185
Section Name:MATHEMATICS CORE
Question:
If Suresh suffer a loss of ₹ 30 by selling x shoes, then equation representing his loss is :

A $2x^2 - 120x - 45 = 0$

B $x^2 + 40x + 15 = 0$

C $x^2 - 40x - 15 = 0$

D $2x^2 + 120x + 45 = 0$

Answer Given By Candidate:**Not Attempted**