P.G. Material ,IIT JAM Entrance Material and Rank Cards

https://elibrarytelangana.blogspot.com/2020/09/cpget-previous-years-entrance-question.html

https://drive.google.com/drive/folders/1wugBrQYOBt8R8uIevWSgrGNteGNgMB4N

CPGET - 2021

OSMANIA UNIVERSITY - HYDERABAD

Logout

Candidate Details :

H.T.No	: 6999977883	Rank	: 221
Name	: RATHLAVATHANITHA	Gender	: F
Father's Name	: RATHLAVATH BHASKER	Date of Birth	: 26-01-2001
Category	: ST	Region	: OU
Parental Income	: Lower	Specialology	:

Provisional Allotment Details :

Alloted College	: University College of Science, Osmania University Campus, Hyderabad		
Course	: M.Sc. Mathematics with Computer Science	College Type	: OU Campus
Alloted Category	: SP_ST_OU_GEN	Payment Type	: Self-Finance

Candidates are informed that the amount shown against the entry total fee payable / refundable is subject to verification of the actual fee paid through online payment in the 1 phase of allotment. The students belonging to SC/ST/BC(EBC)/PH Categories will be considered for Reimbursement of Tuition Fee (TF) which is subject to verification and eligibility criteria Prescribed by Government of Telangana from time to time. In the event of non-eligibility for fee reimbursement, the candidate shall have to pay the total fee.

Instructions to Candidates :

1. **Self Reporting System :** Click on Self Reporting (check box) from the Payment. This activity is **mandatory** soon to confirm your admission.
2. **Payment through online (Net Banking / Credit Card / Debit Card) :** Click on **Pay Now** Button you will be directed to payment Gateway. Make the payment accordingly duly entering the details as per the payment mode selected and after the successful payment, download the successful payment card.
3. **Make the Payment on or before 10/12/2021.** If the candidate fails to pay the amount. The provisional allotment order is cancelled / stands cancelled and candidate has no claim on the provisional admission.
4. The candidate has to report at the college and hand over the acknowledgement card at the college.
5. The Original Transfer Certificate (TC) shall be submitted at the alloted college (Not Compulsory in 1st Phase for those who wish to slide in next phase)
6. Candidates can verify status of self reporting / payment details in student's login by duly clicking on view Joining / Fee Payment Transaction Report.
7. After payment of Tuition Fee, if the candidate cancels the provisional allotment seat, the candidate will forfeit the Counselling Fee of Rs 200/-.
8. Candidates are eligible to participate in second phase of counselling for change of colleges or course.
9. The candidate supposed to take admission in only one of the courses in CPGET - 2021 counselling.

Note:

- **Candidates are informed to verify the transaction limit and validity of Credit Card / Debit Card before proceeding for payment. Candidates are informed to pay Tuition Fee from their own account or parents account. In case of refund, if any, will be remitted to the same account.**

Online Payment

Payment Transaction ID	621979264 (Please Note this for future reference)
Course Fee Rs	35700.00 /-
Fee to be paid Rs :	700.00 /-

☐ I Accept Above terms and Conditions

☐ Self Reporting

Process to Payment

CPGET - 2021

OSMANIA UNIVERSITY - HYDERABAD

Logout

Candidate Details :			
HTNo	: 680860280698	Rank	: 426
Name	: N PAVANI	Gender	: F
Father's Name	: N NARASING RAO	Date of Birth	: 10-06-2000
Category	: SC	Region	: OU
Parental Income	: Lower	SpecialCategory	:

Provisional Allotment Details :			
Alloted College	: University College of Science (OU), Saifabad, Masabtank, Hyderabad.		
Course	: M.Sc. Applied Mathematics	College Type	: OU Constituent
Alloted Category	: SP_SC_OU_FEMALE	Payment Type	: Self-Finance

Candidates are informed that the amount shown against the entry total fee payable / refundable is subject to verification of the actual fee paid through online payment in the 1 phase of allotment. The students belonging to SC/ST/BC/EBC/PH Categories will be considered for Reimbursement of Tuition Fee (RTF) which is subject to verification and eligibility criteria Prescribed by Government of Telangana from time to time. In the event of non-eligibility for fee reimbursement, the candidate shall have to pay the total fee.

Instructions to Candidates :

1. **Self Reporting System :** Click on Self Reporting Check box before the Payment. This activity is **mandatory** so as to confirm your admission.
2. **Payment through online (Net Banking / Credit Card / Debit Card):** Click on **Pay Now** Button you will be directed to payment Gateway. Make the payment accordingly duly entering the details as per the payment mode selected and after the successful payment, download the acknowledgement card
3. **Make the Payment on or before 10/12/2021.** If the candidate fails to pay the amount This provisional allotment order automatically stands cancelled and candidate has no claim on the provisional seat allotment.
4. The candidate has to report at the college and hand over the acknowledgement card at the college
5. The Original Transfer Certificate (T.C.) shall be submitted at the allotted college (Not Compulsory in 1st Phase for those who wish to slide in next phase)
6. Candidates can verify status of self reporting / payment details in student's login by duly clicking on view Joining / Fee Payment Transaction Report.
7. After payment of Tuition Fee, if the candidate cancels the provisionally allotted seat, the candidate will forfeit the Counselling Fee of Rs.700/-.
8. Candidates are eligible to participate in second phase of counselling for change of colleges or course.
9. The candidate supposed to take admission in only one of the courses in CPGET - 2021 counselling.

Note:

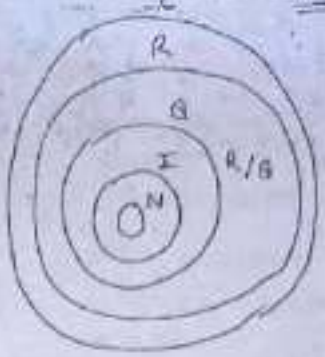
- **Candidates are informed to verify the transaction limit and validity of Credit Card / Debit Card before proceeding for payment. Candidates are informed to pay Tuition Fee from their own account or parents account. In case of refund, if any, will be remitted to the same account.**

Online Payment

Payment Transaction ID	: C21051521 (Please Note this for future reference)
Course Fee Rs	: 35700.00 /-
Fee to be paid Rs	: 700.00 /-

Chapter-1 Matrices

N → Natural no.
I, J or z → Integer
Q → Rational no.
R/Q → Irrational no.
R → Real no.
C → Complex no.
↳ Biggest number System



Defⁿ. of Matrices :- A set of mn numbers arranged in the form of rectangular array. Containing m rows and n columns is known as m×n matrix (m by n)
(It is read as m×n matrix)

⊙ It is also known as matrix of Order m by n (m×n)

⊙ Usually A, B, C ---- denoted as matrices

⊙ The numbers forming a matrix are known as elements or entries of a matrix.

$$A = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}_{m\times n}$$

Col 1, Col 2 -- Col j --- Col n

$$A = \begin{bmatrix} & & & \\ & & & \\ & a_{ij} & & \\ & & & \end{bmatrix}_{m\times n}$$

row 1, row 2, ..., row i, ..., row m

a_{ij} ↓ row no. ↓ Column no.

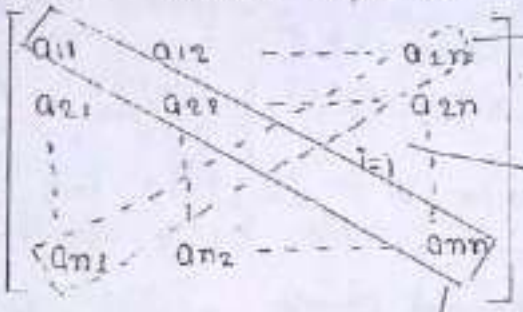
⊙ The no. of the $(i, j)^{th}$ place. A matrix is denoted by a_{ij}. (i ↓ row, j ↓ Column)

⊙ $A = [a_{ij}]_{m\times n}$

$1 \le i \le m$

$1 \le j < n$

4) **Square Matrix**:- A matrix containing same no. (3)
of rows and columns is known as Square matrix. It is denoted by $A = [a_{ij}]_{m \times n}$, $m=n$
Also known as Square matrix of Order n.
or n - rowed Square matrix.
n - Columned Square matrix



First:- $j = i+1$
$j = i+2$
$\vdots$
$j = i+(n-1)$

Second:- $j = i+2$
$j = i+3$
$\vdots$
$j = i+(n-2)$

Principal diagonal elements are
a_{11}
a_{22}
$\vdots$
a_{nn}

Defn:- In Square matrix $A = [a_{ij}]_{n \times n}$ the line along which elements a_{ii} i.e. $i = 1, 2, \ldots, n$ lies is known as Principal diagonal line.

The elements a_{ii}, $i = 1, 2, \ldots, n$ lying along Principal diagonal line are known as diagonal elements of the matrix. If Order $(A) = n$, then number of diagonal elements in A is equal to n.

Defn:- In Square matrix $A = [a_{ij}]_{n \times n}$ the line along which elements $a_{i,i+1}$, $i = 1, 2, \ldots, n-1$ lies is known as Super diagonal line.

The elements $a_{i,i+1}$, $i = 1, 2, \ldots, n-1$ lying along Super diagonal line are known as Super

(5)

REAL ANALYSIS

Real Analysis (50 marks)

1) Compact / Connected.
2) Sequence / Series
3) Countability
4) Continuity / Uniform Continuity.
5) Application of differentiation.
6) Sequence / Series of function

Syallabus

1) Point Set Topology on R.
2) Sequence & Series of Real No.
3) funct^n (even / odd function, Periodical funct^n, monotone funct^n, Graph of funct^n.
4) Countability
5) Continuity, limit, Uniform Continuity
6) Differentiability and application of Derivative
7) Riemann Integration.
8) Improper Integral.
9) function of Bounded variation.
10) Sequence and Series of the function.

Some Standard Notation

1) $\mathbb{N}$ → Set of Natural No.
2) $\mathbb{Z}$ → Set of Integers
3) $\mathbb{Q}$ → Set of Rational No
4) $\mathbb{Q}^c$ → Set of Irrational No.
5) $\mathbb{R}$ → Set of Real No.
6) $\mathbb{C}$ → Set of Complex No.
7) C → Set of all Real convergent Sequence.
8) C_0 → Set of all Real Sequence that are convergent to zero.
9) C_{00} → Set of all eventually zero Sequence.
10) $C[a,b]$ → Set of all continous funcⁿ in the Interval a to b.
11) $C^n[a,b]$ → n-times continously differentiability.
12) $R[a,b]$ → set of R.I function on $[a,b]$.
13) $B[a,b]$ → Set of all Bdd function on $[a,b]$.
14) $B_r[a,b]$ → Set of all bdd variation funcⁿ on $[a,b]$.
15) $\not\exists$ → contradiction

Vijay bhaskar Reddy

ORDINARY DIFFERENCIAL EQUATION

DIFFERENTIAL EQUATION:→ An equation which involves derivatives of one or more than one dependent variables w.r.t. one or more than one independent variables, is called Diff. eqn.

e.g. ① $\frac{d^2y}{dx^2} + \frac{dy}{dx} = e^x$

② $\frac{d^2y}{dx^2} + \frac{dz}{dx} = x$ where y, z are functions of x. (Dependent: y, z; independent: x)

③ $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$ where z is function of x and y. (z: Dependent; x, y: independent)

ORDINARY DIFF. EQN :→ A diff. eqn is said to be ordinary diff eqn if it involves derivatives of one or more than one dependent variable w.r.t. single independent variable.

e.g. ① $\cos x \frac{d^3y}{dx^3} - \frac{dy}{dx} = \sin x$ —— ODE. with one dependent variable

② $\frac{dy}{dx} - 2\frac{dz}{dx} = \sin z$. ⟶ ODE. with two dependent variable

Order of O.D.E. :→ The order of the highest derivative occuring in the ODE is called Order of the ODE.

e.g. ① $\frac{d^3y}{dx^3} + \left(\frac{d^2y}{dx^2}\right)^5 = y \longrightarrow$ Order = 3

② $\sin\left(\frac{dy}{dx}\right) = x+y \longrightarrow$ order = 1.

③ $\frac{d^2y}{dx^2} + \frac{dz}{dx} = e^z \longrightarrow$ Order = 2.

Degree of O.D.E. :→ The highest exponent of the highest order derivative occuring in the given ODE is called degree of that ODE after making it free from radicals, fraction and transcendental functions as far as only derivatives are concerned.

e.g. ① $\frac{d^3y}{dx^3} + \left(\frac{d^2y}{dx^2}\right)^{100} + y = 0 \rightarrow$ Degree = 1

② $\frac{d^3y}{dx^3} + \left(\frac{d^3y}{dx^3}\right)^{100} + y = 0 \longrightarrow$ Degree = 100

(3) $\frac{d^2y}{dx^2} + \frac{dy}{dx} = \sin y$ ⟶ Degree = 1

(4) $\left(\frac{d^2y}{dx^2}\right)^{2/3} = \left(1 + \frac{dy}{dx}\right)^3 \rightarrow \left(\frac{d^2y}{dx^2}\right)^2 = \left(1 + \frac{dy}{dx}\right)^6 \rightarrow$ Degree = 2

(5) $\sin\left(\frac{dy}{dx}\right) = y \longrightarrow$ Degree not define.

e.g. $\log\left(1 + \left(\frac{dy}{dx}\right)^2\right) = y$

$\Rightarrow 1 + \left(\frac{dy}{dx}\right)^2 = e^y \rightarrow$ Degree = 2

NOTE: Order of ODE is always defined but degree may or may not be.

e.g. $\frac{dy}{dx} + \int_0^x y(t)\,dt = x$ —(A)

⟷ Integro - Differential Eqn.

Differentiate (A) w.r.t. x;

$$\frac{d}{dx}\int_{H(x)}^{G(x)} \phi(x,t)\,dt = \int_{H(x)}^{G(x)} \frac{\partial}{\partial x}(\phi(x,t))\,dt \quad \text{Leibnitz.}$$

$$+G'(x)\cdot\phi(x,G(x)) \quad -H'(x)\cdot\phi(x,H(x))$$

Vijay Bhaskar Reddy

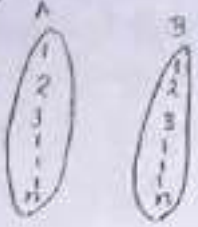
FUNCTION

Function: Let $f: A \to B$ be any mapping and $|A| = n$ and $|B| = m$ then total Number of function from A to B $= m^n = |B|^{|A|}$

Case (I): If $n = m$ then

Total no. of mapping $= n^n$

# of one-one mapping $= n!$



Possibility for 1 = n
Possibility for 2 = n-1
⋮
Possibility for n = 1

Total # of possibility $= n(n-1)(n-2)\cdots 1 = n!$

# of onto mapping $= n!$ (since $|A| = |B|$ and it is one-one)

$=$ # one-one mapping

(Because $|A| = |B| < \infty$)

Case (II): If $n < m$ then

Total no. of mapping $= m^n$

Total no. of one-one mapping $= {}^mC_n \cdot n(n-1)\cdots 1$

$= {}^mC_n \, n!$

Total no. of onto mapping $= 0$ (since $n < m$ then at least 1 elem of B has no pre-image)

(Note) → (Conclusion) → For onto mapping

$\boxed{|B| < |A|}$

Case (III): If $n > m$ then

Total no. of mapping $= m^n$

one-one mapping $= 0$

onto mapping $= \sum_{r=0}^{m} (-1)^r \, {}^mC_r \, (m-r)^n$

$|A| = 2$
$|B| = 2$
$\sum_{r=0}^{2} (-1)^r \, {}^2C_r$
$(2-r)^2$
${}^2C_0 \times 2 - {}^2C_1$
$4 - 2$

Question:

Qus: $A = \{1,2,3\}$ and $B = \{1,2,3,4,5\}$. choose the correct statements

(1) Total no. of functions from A to B = 125

(2) " " " A to B = 243

(3) Total number of one-to-one function from A to B is 60.
X(+) Total no of " " " " is 120.

Sol^n: $A = \{1,2,3\}$ & $B = \{1,2,3,4,5\}$

Total no of mapping $= (5)^3 = 125$

Total no. of one-one mapping $= {}^5C_3 \times 3! = \frac{5\times4\times3\times2!}{3!\times2!} \times 3!$

$= 60$

Dec 2014

Que: The number of surjective maps from a set of 4 elements to a set of 3 elements is

(1) 36 (2) 64 (3) 69 (4) 81

Sol^n: $f: A \longrightarrow B$ and $|A| = 4 = n$ & $|B| = 3 = m$ $\quad m < n$

onto mapping from A to B $= \sum_{r=0}^{m-1} (-1)^r \, {}^mC_r \, (m-r)^n$

$= \sum_{r=0}^{2} (-1)^r \, {}^3C_r \, (3-r)^4 = (-1)^0 \, {}^3C_0 \, (0+3)^4 + (-1)^1 \, {}^3C_1 \, (3-1)^4 + (-1)^2 \, {}^3C_2 \, (3-2)^4$

$= 81 - 3 \times 16 + 3$

$= 84 - 48 = 36$

Least common multiple: The least common multiple of two non-zero integers a & b is the smallest positive integer that is multiple of both a & b. It is denoted by lcm (a, b). (a ≠ 0, b ≠ 0)

Example: a = 4 ; b = 6 then lcm (a, b) = 12

→ Every common multiple of a & b is a multiple of lcm (a, b)

$-20 = 3\times(-6)+(2)$ → wrong because remainder is not

Division Algorithm: Let $a, b \in \mathbb{Z}$ and $b > 0$ then $\exists$ unique q and r in $\mathbb{Z}$ such that

$a = bq + r$, where $0 \le r < b$

q is called quotient and r is called remainder, when b divides a.

For example: (1) Find quotient and remainder when $b \mid a$, where $a = 20, b = +3$.

Soln. $20 = +3\times(+6)+2$

$a = bq + r$ Here $0 \le 2 < 3$

(2) $a = -20$ and $b = 3$ then

$-20 = 3\times(-7)+1$

$0 \le r < 3 \Rightarrow 0 \le 1 < 3$

Extended Division Algorithm: Let $a, b \in \mathbb{Z}$ and $b \neq 0$ then $\exists$ unique q & r in $\mathbb{Z}$ such that

$a = bq + r$, where $0 \le r < |b|$

For example: $a = 20$ & $b = -3$

$20 = (-3)\times(-6)+2$ $\quad 0 \le 2 < |-3|$

then $r = 2$, $q = -6$

Qus $b = -5$ and $a = 11$ then find quotient and remainder

Soln: $11 = (-5)\times(-2)+1$

where $q = -2$ & $r = 1$ and $0 \le 1 < |-5|$ i.e., $0 \le r < |b|$

Qus: $a = 3$, $b = 20$ then

$3 = 20\times(0)+3$ where $q = 0$, $r = 3$ $\quad 0 \le r < b$

Note: (i) $a \mid b$, a divides b. $(r = 0)$

(ii) $a \nmid b$, a does not divide b. $(r \neq 0)$

Vijay Bhaskar Reddy

CALCULAS

DATE : .....

Calculus

Differential Integral Vector

* Differential Calculus :-

° There is one-to-one correspondence between a point on a straight line and a real number.

* Inequalities, Equations & Sign-Scheme :-

Question: $\frac{2}{x} + 1 = 11$, Find x.

Solution:

$$\frac{2}{x} + 1 = 11 \Rightarrow \frac{2}{x} = 4 \Rightarrow x = \frac{2}{4} = \frac{1}{2}$$

Question: $(x-1)^{2017}(x-2)^{2018} = 0$, Find x.

Solution: $(x-1)^{2017}(x-2)^{2018} = 0$

$x = 1$, $x = 2$

Question: $x < 1$, Find x.

Solution: $x < 1$

$\Rightarrow x \in (-\infty, 1)$

Question: $(x-1)(x-2) < 0$, Find x.

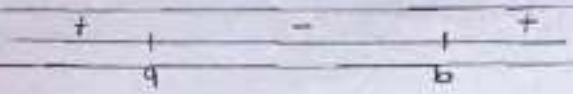
Solution: $(x-1)(x-2) < 0$

let $(x-1)(x-2) = 0$ — and find its zero's.

$x = 1, 2$

DATE: .....

Note: If $a < b$ then sign scheme of expression $(x-a)(x-b) < 0$ is as follows:



→ If $(x-a)^{odd}(x-b)^{odd} < 0$

→ If $\frac{(x-a)^{odd}}{(x-b)^{odd}} < 0$

} In both case sign scheme remain same as above.

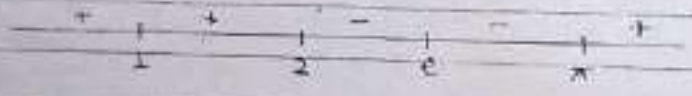
If $a < b < c < d$ then sign scheme

$(x-a)(x-b)(x-c)(x-d) < 0$

or $(x-a)^{odd}(x-b)^{odd}(x-c)^{odd}(x-d)^{odd} < 0$

Question: Write down or sketch the sign scheme of expression $(x-1)^{2016}(x-2)^{2017}(x-e)^{2018}(x-\pi)^{2019} < 0$

Answer:



Question: For what real values of x, $\frac{4}{x} < 3$.

Solution: Case I: If $x > 0$ then

$\frac{4}{x} < 3 \Rightarrow 4 < 3x \Rightarrow \frac{4}{3} < x \Rightarrow x > \frac{4}{3}$

$\Rightarrow x \in \left(\frac{4}{3}, \infty\right)$

Case II: If $x < 0$ then

$\frac{4}{x} < 3 \Rightarrow 4 > 3x \Rightarrow \frac{4}{3} > x \Rightarrow x \in (-\infty, 0)$

(4)

DATE :

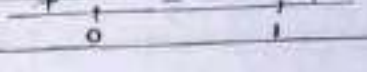
$\Rightarrow x \in (-\infty, 0) \cup \left(\frac{4}{3}, \infty\right)$

Question: For what values of x, $\frac{4}{x(x-1)} < 3$.

Solution: Case I: If $x(x-1) < 0$, then inequality holds

$x(x-1) < 0$

$\Rightarrow x \in (0, 1)$



Case II: If $x(x-1) > 0$

$\Rightarrow x < 0$ or $x > 1$

then $\frac{4}{x(x-1)} < 3 \Rightarrow 4 < 3x^2 - 3x$

$\Rightarrow 3x^2 - 3x - 4 > 0$

roots $\rightarrow \frac{3 \pm \sqrt{9+48}}{6} = \frac{3 \pm \sqrt{57}}{6}$

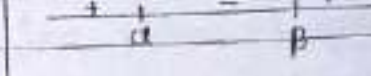
$\Rightarrow x \in \left(-\infty, \frac{3-\sqrt{57}}{6}\right) \cup \left(\frac{3+\sqrt{57}}{6}, \infty\right)$

Finally with both cases:

$x \in \left(-\infty, \frac{3-\sqrt{57}}{6}\right) \cup (0, 1) \cup \left(\frac{3+\sqrt{57}}{6}, \infty\right)$

Note: $(x-\alpha)(x-\beta) > 0$

$\alpha < \beta$



then $x \in (-\infty, \alpha) \cup (\beta, \infty)$

Question: For what values of x, $\frac{4}{x(x-1)} < -3$.

Solution: Case I: $x(x-1) > 0$, then inequality never holds.

Case II: If $x(x-1) < 0$

then $x \in (0, 1)$