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Paper: GE-4.3

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		(Combinatorial Mathematics)	
. 1.	(a)	Find ⁶ P ₂ .	
	(b)	Find ⁶ P ₂ . State the principle of inclusion.	7
	(c)	A student has a	1
		A student has 3 pens and 2 pencils. In how many ways can he take a pen and pencil?	
	(d)		2
		-10W Mon-	
	(e)	formed using 3, 4, 5, 6, 7?	2
	(6)	For a set of six true or false questions, find the number of ways of answering all questions.	
	<i>(f)</i>	Find the number of distinguishable words that can be formed from the letters of MADAM.	2
	(g)	Show that ${}^nC_r = {}^nC_{n-r}$.	2
2.	(a)	Write the principle	2
	(b)	Write the principle of pigeonhole. How many integers between 1 and	2
		(i) divisible by 3 or 5;	
		(ii) divisible t	
		(ii) divisible by 3, but not by 5 or 6?	

	Let A and B be subsets of a finite Let A and B be subsets of a finite universal set U. Then show that $A = A + B + A \cap B$
	hsets of a
	B be show that
	Lat A and II Then 3
(c)	Let a set uB-A BI
	Let A and B be subsets of a line. Let A and B be subsets of a line. Then show that $A = A + B = A $
	1 Or
	numbers from 1
	if any live have of them will
	Show that if any five numbers from 1 Show that if any five numbers from 1 to 8 are chosen, then two of them will to 9.
	show that to 8 are chosen, then to a add to 9.
	1 10 9.
	to 8 and add to 9. generating function.
	anoting function.
156	add to 2 Define a generating function. 2 a) Define a generating function to count
3. (Define a generating function to count b) Find a generating function to count c) Find a generating function function to count c) Find a generating function fu
J. (TONETALITE INTENTIONS
- 1	Find a generating function to contain the number of integral solutions to the number of for each $i, e_i \ge 0$.
	the number 10 if for each 4 of
	Find a general solution the number of integral solution $e_1 + e_2 + e_3 = 10$ if for each $i, e_i \ge 0$. (c) Answer any two questions of the $4 \times 2 = 8$
	$\frac{1}{4}$ questions of the $\frac{1}{4}$
	any two quees 4x2-0
	(c) Answer
	following exponer
	that the for the
	(i) Show that function for the generating function for the sequence (l, 1.3, 1.3.5, 1.3.5.7,)
	generating 1.3, 1.3.5, 1.0
	is $(1-2x)^{\frac{3}{2}}$.
	is $(1-2x)^{-2}$. (ii) Find the binomial generating function for the sequence
	binomial B
	(ii) Find the sequence
	a = 1, 2, 3, 3
	ances Collections
	(iii) Find the sequences to the ordinary generating functions to the ordinary $(3+x)^3$, $(3x^3+e^{2x})$ and $2x^2(1-x)^{-1}$.
	to the ordinate $3 + e^{2x}$ and $2x^2(1-x)$
	$(3+x)^3$, $(3x^{-7})^3$
	Continue
	Conta

- 4. (a) Write about a recurrence relation.
 - (b) Solve the recurrence $a_n = a_{n-1} + 3$ with $a_1 = 2$. relation

2

(c) Find the solution to the recurrence

 $a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3}$ with initial conditions $a_0 = 2$, $a_1 = 5$ and a₂ = 15. Smill governous

(d) Find the explicit formula for the Or

Find all solutions of the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2} + 7^n$.

- 5. (a) Write the number of partitions of 5.
 - (b) Find the ordinary generating function

 11 >->0. of the sequence $< C(r+n-1, n-1) >_{r \ge 0}$.
 - Find the coefficient of x^7
- solutions to the number of positive integral z = 10. 3 solutions to the equation x + y + z = 10. ²⁴P/1326

Prove that or 70 age of a grant Find the values of the extended binomial coefficients teamno ni me atsert

 $\begin{pmatrix} -2\\3 \end{pmatrix}$ and $\begin{pmatrix} \frac{1}{2}\\3 \end{pmatrix}$

- 6. (a) Determine the cycle index of the alternative group A(n).
 - Show that there are precisely 17824 rotations) (under distinguishable vertex colourings of the regular dodecahedron using 1 or 2 colours.
 - Find the number of distinguishable necklaces consisting of 7 stones of which 2 stones are red, 3 stones are blue, 2 stones are green when both rotational and reflectional symmetries are considered.
- What do you mean by a symmetric 7. (a) BIBD?
 - Illustrate the procedure for the group of subsets of $X = \{a, b\}$ under the symmetric difference.

Or

Find the number of (rotationally) distinct ways of painting the faces of a cube using 6 colours, so that each face is of different colours.

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(Continued)

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6

1

5

(c) Prove that, in case of a symmetric BIBD, any two blocks have λ treatment in common.

Or

Find how many different necklaces having 10 beads can be formed using 2 different kinds of beads, if (i) both flips and rotations and (ii) rotations only considered.

the subsection * * * * or 0 colours.

Find the number of distinguishable

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