CHAPTER 13

PROBABILITY

CASE STUDY BASED QUESTIONS

Q No	Question						
1	A problem on Coordinate geometry is given to Sainking, Debasisha and Siba. The Probabilities that						
	they solve the problem correctly are 1/3, 2/7 and 3/8 respectively. If they try to solve the problem						
	simultaneously, answer the following questions:						
(i)	The Probability that all the three solve the problem correctly, is						
	(a) 1/14 (b) 1/28 (c) 5/42 (d) 5/28						
(ii)	The probability that only Sainking solves the problem correctly, is						
	(a) 5/168 (b) 15/168 (c) 25/168 (d) 25/42						
(iii)	The probability that only Sainking and Siba solves the problem correctly, is						
	(a) 5/84 (b) 5/168 (c) 1/28 (d) 25/168						
(iv)	The probability that exactly one of them solves the problem correctly, is						
	(a) 5/36 (b) 5/56 (c) 25/56 (d) 1/56						
(v)	The probability that none of them solves the problem correctly, is						
	(a) 5/84 (b) 5/168 (c) 35/84 (d) 25/84						
2	A manufacturer has three machine operators A, B and C. The first operator A produces 1%						
	defective items whereas the other two operators B and C produce 5% and 7% defective items						
	respectively. Operator A is on the job for 50% of the time, B on the job for 30% of the time and C						
(1)	on the job for 20% of the time.						
(1)	An item is chosen from the items produced. The probability that it is defective is						
(::)	$\begin{array}{c c c c c c c c c c c c c c c c c c c $						
(11)	(a) 0.01 (b) 0.05 (c) 0.07 (d) 0.7						
(;;;)	A defective item is produced, the probability that it was produced by operator A is						
	(a) $5/34$ (b) $15/34$ (c) $7/37$ (d) $22/34$						
(iv)	A defective item is produced. The probability that it was produced by operator B is						
(10)	(a) $5/34$ (b) $15/34$ (c) $7/37$ (d) $13/34$						
(v)	A defective item is produced, the probability that it was produced by operator B or operator C, is						
	(a) 5/34 (b) 15/34 (c) 7/17 (d) 29/34						
3	A company has two plants to manufacture TVs. The first plant (plant-A) manufactures 70% of the						
	I vs and the rest are manufactured by the second plant. 80% of the TVs manufactured by the first						
	plant are rated of standard quality, while that of the second plant only 60% are of standard						
	quality. One TV is selected at random.						
	Based on the above information answer the following :						

(i)	Probability	that the TV wa	IS		manufactured
	by the seco	ond plant is			
	7	3	4		
	(a) <u>–</u> 10	(b) <u>-</u> 10	(c) <u>–</u> 25		
	2				
	(d)				
	10				
(ii)	Probability	that the TV is o	of standard qua	ality, given that it was mad	de by 1 st plant is
	(a) 0 _. 6	(b) ⁰ .7	(c) ⁰ . ⁸	(d) ⁰ .4	
(iii)	It is given t	that the TV is no	t manufacture	d hy 1st plant. Then proh	ability that it is rated of standard
	auality is			a by 13t plant. men prob	ability that it is rated of standard
	1	7	4	3	
	(a) <u>–</u>	(b) <u>-</u>	(c) _	(d) _	
	5	10	5	5	
(iv)	Probability	that the select	ed TV is of star	ndard quality is	
	(a) ⁰ .74	(b) ⁰ .18	(c) ⁰ .56	(d) ⁰ .48	
(v)	If the sele	cted TV is found	to be of stand	lard quality, then the prob	pability that it was produced by
	the second	l plant is			
	14	9	9	37	
	(a) <u>-</u> 25	(b) <u>-</u> 50	(c) <u>-</u> 37	(d) <u>-</u> 50	
4	The reliabi	lity of a COVID	Rapid Antigen	test is specified as follows	:
	Of people	having COVID. 8	30% of the test	detects the disease but	
	20% goes ι	undetected. Of	people free of	COVID, 90% of the test is	
	judged CO	VID negative bu	ıt 10% are diag	nosed as showing COVID	
	positive. Fi	rom a large pop	ulation of whic	ch only 0.1% have COVID,	
	one persor	n is selected at I	random, given	the Rapid Antigen test, an	nd coup-is
	the pathol	ogist reports hi	m/her as COVII	D positive.	Supra.
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	Let E_1, E_2 and A be the events that people affected by COVID, not affected by COVID and test result						
	is positive respectively						
	Based on th	ne above inform	ation answer th	e following : (Answer any four)			
(i)	What is the probability the selected person is not affected by COVID?						
	(a) 0.99	(b) 0.9	(c) 0.99	(d) 0.999			
(ii)	It is given t	hat the selected	person is affect	ted by COVID. What is the probability th	nat the person is		
	tested posit	ive is					
	(a) 0.08	(b) 0.8	(c) 0.1	(d) 0.9			
(iii)	What is the	value of $P(A/E_2)$)?				
	(a) 0.8	(b) 0.08	(c) 0.9	(d) 0.1			
(iv)	What is the	value of ?					
	(a) 0.1007	(b) 0.0999	(c) 0.0008	(d) 0.7993			
(v)	What is the	probability that	the 'person is a	actually having COVID given that 'he is te	ested as COVID		
	positive'?						
	10	8	8	999			
	(a) <u>99</u> 9	^(b) 7 993	(c)	(d) <u>100</u> 7			
			(1)		- (
5	In pre board	exam of class a	(II, commerce s	tream with Economics and Mathematics	of a particular		
	school, 50%	of the students	failed in Econo	mics, 35% failed in Mathematics and 25	% failed in both		
	the subjects. A student is selected at random from the class.						
	Based on th	e above inform	ation, answer th	e following questions			
(i)	The probab	oility that the se	lected student	has failed in Economics, if it is known th	hat he has failed		
	in Mathematics, is						
	3	12	1	5			
	A <u>1</u> 0	B <u>-</u> 25	$\begin{array}{c} C & - \\ 4 \end{array}$	D _7			
(ii)	The probabi	ility that the cal	acted student h	as failed in Mathematics if it is known th	at he has failed		
			כנופט גוטטפוון וו	as fangu in mathematics if it is known th	iat 110 1185 181100		
		.5					

	22 12 1 3
	A $\overline{25}$ B $\overline{25}$ C $\overline{2}$ D $\overline{25}$
(iii)	The probability that the selected student has passed in at least one of the two subjects, is
	1 1 3
	$A = \frac{1}{4} \qquad B = \frac{1}{2} \qquad C = \frac{1}{4} \qquad D N.O.T.$
(iv)	The probability that the selected student has failed in at least one of the two subjects, is
	3 22 2 43
	$\begin{bmatrix} A \\ \overline{5} \end{bmatrix} \begin{bmatrix} B \\ \overline{25} \end{bmatrix} \begin{bmatrix} C \\ \overline{5} \end{bmatrix} \begin{bmatrix} D \\ \overline{100} \end{bmatrix}$
(v)	The probability that the selected student has passed in Mathematics if it is known that he has
	failed in Economics, is
	2 3 1 1
	$A = \frac{1}{5} B = \frac{1}{4} C = \frac{1}{3} D = \frac{1}{2}$
6	A doctor is to visit a patient. From the past experience, it is known that the probabilities that he
	will come by cab, metro, bike or by other means of transport are 0.3, 0.2, 0.1 and 0.4 respectively.
	the probabilities that he will be late are 0.25, 0.3, 0.35 and 0.1 if he comes by cab, metro, bike or
	other means of transport respectively
(i)	When the doctor arrives late, what is the probability that he comes by metro?
	5 2 5 1
	A $\overline{14}$ B $\overline{7}$ C $\overline{21}$ D $\overline{6}$
(ii)	When the doctor arrives late, what is the probability that he comes by cab?
	4 1 5 2
	$\begin{bmatrix} A & \overline{2}1 & B & \overline{7} & C & \overline{1}4 & D & \overline{2}1 \end{bmatrix}$
(iii)	When the doctor arrives late, what is the probability that he comes by metro?

	5 4 5 1
	$A = \frac{1}{21}$ $B = \frac{1}{2}$ $C = \frac{1}{2}$ $D = \frac{1}{2}$
(iv)	When the doctor arrives late, what is the probability that he comes by other means of transport?
	A = B = C = D = D
(v)	What is the probability that the doctor is late by any mean?
	1 1
	$\begin{bmatrix} A & 1 & B & 0 & C & \frac{1}{2} & D & \frac{1}{4} \end{bmatrix}$
7	A group of people start playing cards. And as we know a well shuffled pack of playing cards
	contains a total of 52 cards. Then 2 cards are drawn simultaneously
	EA EA ALLAND
	Using the information given above answer the following :
(i)	If $y = n_0$ of kings = 0, 1, 2. Then $P(y=0) = 2$
(1)	128
	(A) ${221}$
	198
	$(B) \frac{1}{200}$
	223
	197
	(C)
	290

	187
	(D) $\frac{1}{221}$
(ii)	If x = no. of kings = 0, 1, 2. Then P(x=1) = ?
	32
	$(A) \frac{1}{229}$
	22
	(B) —
	227
	32
	(C) $\frac{1}{221}$
	32
	(D) <u>21</u> 9
(iii)	If x = no. of kings = 0, 1, 2. Then $P(x=2) = ?$
	(A)
	219
	1
	^(B) 221
	3
	(C) <u>2</u> 09
	1
	ב
	209
8	Anand, Samanyu and Shah of shortcut classes were given a problem in mathematics whose
	1 1 1
	respective probability of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. They were asked to solve it independently.

(1)	Using the information given above, answer the following :
(1)	The probability that Anand alone solves it is
	(A) $\frac{1}{4}$
	3
	(B)
	$(b) \overline{4}$
	(C) $\frac{1}{24}$
	17
	(D)
	24
(ii)	The probability that the problem is not solved is
	(A) $\frac{1}{4}$
	2
	(B) $\frac{-}{4}$
	(C) 0
	11
	(D) —
) ⁻ 24
(iii)	The probability that the problem is solved is
	(A) $\frac{1}{4}$
	4

	3
	(B) <u>_</u>
	4
	17
	11
	$(D) \frac{1}{24}$
(iv)	The probability that exactly one of them solves the problem is
	1
	(A) $\frac{1}{4}$
	3
	(B) —
	(⁻ , 4
	17
	$\left(C\right) \frac{1}{24}$
	11
	$(D) \frac{1}{24}$
(v)	The probability that exactly two of them solves the problem is
	1
	(A) $\overline{\underline{A}}$
	3
	(B) <u>–</u>
	4
	17
	$\frac{1}{24}$

	11
	(D) $\frac{1}{24}$
	24
9	Monu and Sonu went into a Dussehera fair where number of games wereorganized. Both of them
	went to a stall where one target is to be hitted then they would get a beautiful gift. The probability
	1
	of hitting a target by Monu was – and the probability that Sonu hit the target is –. If each of Monu
	3 5
	and Sonu shoots at the target.
	MONU
(1)	
(1)	Find the probability of not hitting the target by SONU?
	2
	(A) —
	5
	3
	$\left(B\right) = \frac{1}{5}$
	4
	5
	1
	(D)
	5
(ii)	Find the probability of none of them hit the target.
	1
	$\left \begin{array}{c} (A) \\ \overline{5} \end{array} \right $

	3
	(B) _
	2
	5
	(D) 1
(iii)	Find the probability that target is hit.
	3
	$(A){5}$
	(B) O
	4
	$\left(^{\text{C}}\right)_{\overline{5}}$
	(D) 1
(iv)	Find the probability that exactly one of them hit the target.
	(Δ) –
	15
	6
	$\binom{(C)}{15}$
	7
	(D) <u>1</u> 5
10	In an office three employees Aman, Aryan and Biswajit process incoming copies of a certain form.
	Aman processes 50% of the forms, Aryan processes 20% and Biswajit the remaining 30% of the forms. Aman has an error rate of 0.06. Aryan has an error rate of 0.04 and Picuvajit has an error
	rate of 0.03.
	1

	Deced on the charaction ensures the fellowing:
(:)	Based on the above information answer the following:
(1)	the form is:
	(B) 0.04
(!!)	(D) 0.06
(11)	The probability that Aryan processed the form and committed an error is:
	(A) 0.005
	(B) 0.006
/	
(111)	The total probability of committing an error in processing the form is:
	(B) 0.04/
	(C) 0.234
(1V)	The manager of the company wants to do a quality check. During inspection he selects a form at
	random from the days output of processed forms. If the form selected at random has an error, the
	probability that the form is not processed by Aman is:
	(A) 1
	30
	$(B) \frac{1}{47}$
	47
	20
	$(C) \frac{1}{47}$
	יד
	17
	(D)
	47
11	

A coach is training 3 players. He observes that the player A can hit a target 4 times in 5 shots						
,player B can hit 3 times in 4 shots and the the player C can hit 2 times in 3 shots.						
The probability that A ,B and C all will hit is						
(a)4/5	(b)3/5	(c)2/5		(d)1/5		
What is the p	robability that B	,C will hit and A v	/ill lose?			
(a)1/10	(b)3/10	(c) [*]	7/10	(d)4/10		
What is the p	robability that a	ny two of A,B and	C will hit?			
(a)1/30	(b)11/	30	(c)17/30	(d)13/	′30	
What is the p	robability that n	one of them will h	it the target?			
(a)1/30	(b)1/60	(c)1/1	5	(d)2/15		
What is the p	robability that a	t least one of A , E	or C will hit t	he target?		
(a)59/60	(b)2/5	(c)3/5		(d)1/60		
In answering a	a question on a	multiple choice te	st for class XII	, a student eitl	her knows the answer	
or guesses. Le	et 3/5 be the pro	bability that he ki	nows the ansv	ver and 2/5 be	the probability that he	
guesses. Assume that a student who guesses at the answer will be correct with probability 1/3.Let						
E_1,E_2 , E be the events that the student knows the answer, guesses the answer and answer						
correctly resp	ectively.					
What is the va	alue of P(E ₁)?					
(a)2/5	(b)1/3	(c)1		(d)3/5		
The value of F	$P(E/E_1)$ is					
(a)1/3	(b)1	(c)2/3	(d)4/5		
equals						
(a)11/15	(b)4/15	(c)1/5	(d)1		
Value of equ	als					
(a)1/3	(b)1/5	(c)1	(d)	3/5		
What is the probability that the students knows the answer given that he answered it correctly?						
	· · · · · · · · · · · · · · · · · · ·					
	A coach is trai ,player B can The probabilit (a) 4/5 What is the pro- (a) 1/10 What is the pro- (a) 1/30 What is the value of F (a) 1/3 equals (a) 11/15 Value of equals (a) 1/3 What is the pro- (a) 1/3 Pro-	A coach is training 3 players. I ,player B can hit 3 times in 4 The probability that A ,B and (a)4/5 (b)3/5 What is the probability that B (a)1/10 (b)3/10 What is the probability that a (a)1/30 (b)11/2 What is the probability that n (a)1/30 (b)1/60 What is the probability that a (a)59/60 (b)2/5 In answering a question on a or guesses. Let 3/5 be the pro- guesses. Assume that a stude E ₁ ,E ₂ ,E be the events that the correctly respectively. What is the value of P(E ₁)? (a)2/5 (b)1/3 The value of P(E/E ₁) is (a)1/3 (b)1 equals (a)1/15 (b)4/15 Value of equals (a)1/3 (b)1/5 What is the probability that f	A coach is training 3 players. He observes that t ,player B can hit 3 times in 4 shots and the the The probability that A ,B and C all will hit is (a) $4/5$ (b) $3/5$ (c) $2/5$ What is the probability that B ,C will hit and A w (a) $1/10$ (b) $3/10$ (c) What is the probability that any two of A,B and (a) $1/30$ (b) $1/60$ (c) $1/130$ What is the probability that none of them will h (a) $1/30$ (b) $1/60$ (c) $1/130$ What is the probability that at least one of A , B (a) $59/60$ (b) $2/5$ (c) $3/5$ In answering a question on a multiple choice te or guesses. Let $3/5$ be the probability that he kr guesses. Assume that a student who guesses at E_1, E_2 , E be the events that the student knows th correctly respectively. What is the value of $P(E_1)$? (a) $2/5$ (b) $1/3$ (c) 1 The value of $P(E/E_1)$ is (a) $1/3$ (b) 1 (c) $2/3$ equals (a) $11/15$ (b) $4/15$ (c) Value of equals (a) $1/3$ (b) $1/5$ (c) 1 What is the probability that the students knows	A coach is training 3 players. He observes that the player A ca player B can hit 3 times in 4 shots and the the player C can F The probability that A ,B and C all will hit is (a) $4/5$ (b) $3/5$ (c) $2/5$ What is the probability that B ,C will hit and A will lose? (a) $1/10$ (b) $3/10$ (c) $7/10$ What is the probability that any two of A,B and C will hit? (a) $1/30$ (b) $11/30$ (c) $17/30$ What is the probability that none of them will hit the target? (a) $1/30$ (b) $1/60$ (c) $1/15$ What is the probability that at least one of A , B or C will hit t (a) $59/60$ (b) $2/5$ (c) $3/5$ In answering a question on a multiple choice test for class XII or guesses. Let $3/5$ be the probability that he knows the answ guesses. Assume that a student who guesses at the answer w E ₁ ,E ₂ , E be the events that the student knows the answer, gue correctly respectively. What is the value of P(E ₁)? (a) $2/5$ (b) $1/3$ (c) 1 The value of P(E/E ₁) is (a) $1/3$ (b) 1 (c) $2/3$ (d) equals (a) $1/3$ (b) 1 (c) $2/3$ (d) What is the value of P(E/I) is (a) $1/3$ (b) 1 (c) $2/3$ (d) equals (a) $1/3$ (b) $1/5$ (c) 1 (d) What is the probability that the students knows the answer as $1/3$ (b) $1/5$ (c) 1 (d) What is the probability that the students knows the answer as $1/3$ (b) $1/5$ (c) 1 (d) What is the probability that the students knows the answer as $1/3$ (b) $1/5$ (c) 1 (d) What is the probability that the students knows the answer as $1/3$ (b) $1/5$ (c) 1 (d)	A coach is training 3 players. He observes that the player A can hit a target ,player B can hit 3 times in 4 shots and the the player C can hit 2 times in 3 The probability that A, B and C all will hit is (a)4/5 (b)3/5 (c)2/5 (d)1/5 What is the probability that B,C will hit and A will lose? (a)1/10 (b)3/10 (c)7/10 (d)4/10 What is the probability that any two of A,B and C will hit? (a)1/30 (b)11/30 (c)17/30 (d)13/ What is the probability that none of them will hit the target? (a)1/30 (b)1/60 (c)1/15 (d)2/15 What is the probability that at least one of A, B or C will hit the target? (a)59/60 (b)2/5 (c)3/5 (d)1/60 In answering a question on a multiple choice test for class XII, a student eit or guesses. Let 3/5 be the probability that he knows the answer and 2/5 be guesses. Assume that a student who guesses at the answer will be correct we E ₁ ,E ₂ , E be the events that the student knows the answer, guesses the answ correctly respectively. What is the value of P(E ₁)? (a)2/5 (b)1/3 (c)1 (d)3/5 The value of P(E/E ₁) is (a)1/3 (b)1 (c)2/3 (d)4/5 equals (a)11/15 (b)4/15 (c)1/5 (d)1 Value of equals (a)1/3 (b)1/5 (c)1 (d)3/5 What is the value is the student knows the answer given that he a	

KEY/ANSWER

(Case Study Based Questions)

<u>.</u>	
Q No	Answer
1 (i)	(b)
(ii)	(c)
(iii)	(a)
(iv)	(c)
(v)	(d)
2 (i)	(b)
(ii)	(c)
(iii)	(a)
(iv)	(b)
(v)	(d)
3 (i)	

	3
	(b) —
	(** / 10
(;;)	0.8
(11)	(c) ⁰ .8
(iii)	3
	(d) _
	5
(iv)	(2) 0 74
	(d) .
(v)	9
	(c) $\overline{37}$
4 (i)	(d) 0.999
(ii)	(b) 0.8
(iii)	(c) 0.1
(iv)	(a) 0.1007
(v)	8
	(c) <u>-</u>
	1007
5 (i)	D
(ii)	С
(iii)	С
(iv)	A
(v)	D
6 (i)	В
(ii)	С
(iii)	D
(iv)	С
(v)	A
7 (i)	А

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(ii)	C
(iii)	В
8 (i)	A
(ii)	A
(iii)	В
(iv)	D
(v)	A
9 (i)	В
(ii)	C
(iii)	A
(iv)	D
10 (i)	В
(ii)	C
(iii)	В
(iv)	D
11 (i)	C
(ii)	A
(iii)	D
(iv)	В
(v)	A
12 (i)	D
(ii)	В
(iii)	A
(iv)	C
(v)	C

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