CHAPTER-13

PROBABILITY

04 MARKS TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	Read the following text and answer the following question on the basis of the same: 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 player C can hit 2 times in 3 shots. (i) Let the target is hit by A,B,C. Then the probability that A, B and C all will hit is (a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{2}{5}$ (d) $\frac{1}{5}$ (ii) What is the probability that B,C will hit and A will lose? (a) $\frac{1}{10}$ (b) $\frac{3}{10}$ (c) $\frac{7}{10}$ (d) $\frac{4}{10}$ (iii) What is the probability that any two of A,B and C will hit? (a) $\frac{1}{30}$ (b) $\frac{11}{30}$ (c) $\frac{17}{30}$ (d) $\frac{13}{30}$ (iv) What is the probability that none of them will hit the target? (a) $\frac{1}{30}$ (b) $\frac{1}{60}$ (c) $\frac{1}{15}$ (d) $\frac{2}{15}$	4
2.	Read the following text and answer the following questions on the basis of the same. In answering a question on a multiple choice test for class XII, a student either knows the answer or guesses. Let $\frac{3}{5}$ be the probability that he knows the answer and $\frac{2}{5}$ be the probability that he guesses. Assume that a student who guesses at the answer will be correct with probability $\frac{1}{3}$. Let, E_1, E_2, E be the events that the student knows the answer, guesses the answer and answers correctly respectively. (i) Value of $P(E\|E_1)$ is (a) $\frac{1}{3}$ (b) 1 (c) $\frac{2}{3}$ (d) $\frac{4}{5}$ (ii) $\sum_{k=1}^{k=2} P(E_k)P(E\|E_k)$ equals	4

	(a) $\frac{11}{15}$ (b) $\frac{4}{15}$ (c) $\frac{1}{5}$ (d) 1 (iii) Value of $\sum_{k=1}^{k=2} P(E_k)$ is (a) $\frac{1}{3}$ (b) $\frac{1}{5}$ (c) 1 (d) $\frac{3}{5}$ (iv) What is the probability that the student knows the answer given that he answered it correctly? (a) $\frac{2}{11}$ (b) $\frac{5}{3}$ (c) $\frac{9}{11}$ (d) $\frac{13}{3}$	
3.	Read the following passage and answer the questions given below: The reliability of a COVID PCR test is specified as follows: Of people having COVID, 90% of the test detects the disease but 10% goes undetected. Of people free of COVID, 99% of the test is judged COVID negative but 1% are diagnosed as showing COVID positive. From a large population of which only 0.1% have COVID, one person is selected at random, given the COVID PCR test, and the pathologists reports him/her as COVID positive. (a) What is the probability of the 'person to be tested as COVID positive' given that 'he is actually having COVID'? (b) What is the probability of the 'person to be tested as COVID positive' given that 'he is actually not having COVID'? (c) What is the probability that the person is actually not having COVID'?	4
4.	Read the following passage and answer the questions given below: There are two antiaircraft guns, named A and B. The probabilities that the shell fired from them hitting an airplane are 0.3 and 0.2 respectively. Both of them fired one shell at an airplane at the same time. (a) What is the probability that the shells fired from, exactly one of them hit the plane? (b) If it is known that the shell fired from exactly one of them hit the plane, then what is the probability that it was fired from B?	4
5.	Anand, Samanyu and Shah of shortcut classes were given a problem in mathematics whose respective probability of solving it are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$. They were asked to solve it independently.	

Using the information given above, answer the following :

(i) The probability that Anand alone solves it is

(A) $\frac{1}{4}$ (B) $\frac{3}{4}$ (C) $\frac{11}{24}$ (D) $\frac{17}{24}$

(ii) The probability that the problem is solved is

(A) $\frac{1}{4}$ (B) $\frac{3}{4}$ (C) $\frac{17}{24}$ (D) $\frac{11}{24}$

(iii)The probability that exactly one of them solves the problem is

(A) $\frac{1}{4}$ (B) $\frac{3}{4}$ (C) $\frac{17}{24}$ (D) $\frac{11}{24}$

(iv) The probability that exactly two of them solves the problem is

(A) $\frac{1}{4}$ (B) $\frac{3}{4}$ (C) $\frac{17}{24}$ (D) $\frac{11}{24}$

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6. 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 Biswajit has an error rate of 0.03.

Based on the above information answer the following:

(i) The conditional probability that an error is committed in processing given that Aryan processed the form is:

(A) 0.0210
(B) 0.04
(C) 0.47
(D) 0.06

(ii) The probability that Aryan processed the form and committed an error is:

(A) 0.005
(B) 0.006
(C) 0.008
(D) 0.68

	(iii) The total probability of committing an error in processing the form is: (A) 0 (B) 0.047 (C) 0.234 (D) 1 (iv) 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 (B) $\frac{30}{47}$ (C) $\frac{20}{47}$ (D) $\frac{17}{47}$	

ANSWERS:

Q. NO	ANSWER	MARKS
1.	(i) C (ii) a (iii) d (iv) b	4
2.	(i) b (ii) a (iii) c (iv) c	4
3.	E= person selected has COVID F=person selected hasn't COVID G= test is judged COVID positive (a) $P\left(\frac{G}{E}\right) = \frac{90}{100} = 0.9$ (b) $P\left(\frac{G}{F}\right) = \frac{1}{100} = 0.01$ (c) Required probability = $1-0.001 = 0.999$	
4.	$E =$ Gun A hits the plane, $F =$ Gun B hits the plane $P(E) = 0.3$ and $P(F) = 0.2$ (a) Let G be the event that exactly one of two shells fired from guns A and B hits the plane. Then, $P(G) = P(E) + P(F) - 2P(EF)$ $= 0.3 + 0.2 - 2 \times 0.3 \times 0.2 = 0.38$ (b) Required Probability= $P\left(\frac{F}{G}\right) = \frac{PF \cap G)}{P(G)} = \frac{P(F \cap \bar{E})}{P(G)} = \frac{P(F)P(\bar{E})}{P(G)} = \frac{0.2 \times 0.7}{0.38} = \frac{7}{19}$	
5.	(i) (A) $\frac{1}{4}$ (ii) (B) $\frac{3}{4}$ (iii) (D) $\frac{11}{24}$ (iv) (A) $\frac{1}{4}$	1 1 1 1

6.	(i) (B) 0.04 (ii) (C) 0.008 (iii) (B) 0.047 (iv) (D) $\frac{17}{47}$	1 1 1 1