Yashwantrao Chavan College of Science, Karad

Department of Computer Science

Question Bank,2023-2024

B.Sc. CS.(Entire)-I

Subject: Probability Theory & Discrete probability Distribution

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1) Define Poisson distribution. Find its mean and variance.
2) If A, B and C are three events defined on Ω such that P(A)=P(C)=1/4, P(B)=1/5, P(A∩B) =1/7, P (B∩C) =P (A∩C) =0
   Calculate (i)P(A∩B') (ii)P(A'∩B) (iii)P(A'∪B) (iv)P(A∪C) (v)P(A∪B∪C)
3) A bag contains 12 one-rupee coins and 4 two-rupee coins. Find the probability of Getting a) a rupee coin if single coin is drawn
   b) three one-rupee coins if three coins are drawn one by one
   c) three coins, one of each type if three coins are drawn at random.
4) Explain with suitable examples : (i) An event (ii)Simple event (iii)Sure event (iv)Impossible event
   (v)Elementry and compound events
5) If A, B and C are three events defined on Ω such that P(A)=P(C)=1/4, P(B)=1/5, P(A∩B)=1/7
   P(B∩C)=P(A∩C)=0
   Calculate (i)P(A∩B') (ii)P(A'∩B) (iii)P(A'∪B) (iv)P(A∪C) (v)P(A∪B∪C)
6) State and prove addition law of probability for two events A and B. State the result for three events.
7) If A, B and C are three events defined on Ω such that P(A)=P(C)=1/4, P(B)=1/5, P(A∩B)=1/7,P (B∩C) =P (A∩C) =0
   Calculate (i)P(A∩B') (ii)P(A'∩B) (iii)P(A'∪B) (iv)P(A∪C) (v)P(A∪B∪C)
8) With usual notations, prove that,
   a) P(A ∪ B) = P(A)+P(B)- P(A∩B)
   b) P(A^c ∪ B) = P(B)- P(A∩B)
9) Define Uniform distribution. Find its mean and variance.
10) Define Binomial distribution. Find its mean and variance.
11) Define:
   i)Sample space   ii)Event
   iii)Mutually Exclusive event   iv)Exhaustive event
   iv)Sure event
12) State and prove addition theorem of probability for two events A&B.

1) State and prove Addition law of probability theorem.
2) Define uniform distribution. Find its mean.
3) A random variable X has following probability distribution
   P(x)=x/6 ;x=1,2,3

Find E(x),V(x)

4)Let P be the probability measure defined on the events of $\Omega=\{\omega_1,\omega_2,\omega_3,\omega_4,\omega_5,\omega_6\}$ such that,

$P\{\omega_1\}=1/8$, $P\{\omega_2\}=1/8$, $P\{\omega_3\}=1/3$, $P\{\omega_4\}=1/12$, $P\{\omega_5\}=1/6$, $P\{\omega_6\}=1/6$

Determined the conditional probability of

(i) $A=\{\omega_2,\omega_3\}$ given $B=\{\omega_1,\omega_3,\omega_4\}$

(ii) $C=(\omega_1,\omega_2,\omega_3,\omega_4\}$ given $D=\{\omega_3,\omega_4,\omega_5,\omega_6\}$

(iii) $C=(\omega_1,\omega_2,\omega_3,\omega_4\}$ given $A=\{\omega_2,\omega_3\}$

5) Define Independence of two events and prove that, A and B' are independent.

6) Define C.D.F and state it's any four properties.

7)Let A and B be two events defined on Ω.

If P(A)=0.4, P(A∪B)=0.7 and P(B)=K:find the value of K if A and B are (i)Mutually exclusive and (ii)Independent

8)If A and B are two events defined on Ω such that, A C B, then P(A) ≤ P(B)

9)Explain the concept of conditional probability.

10)An unbiased coin is tossed twice. Find the probability that

(i)exacty one head

(ii) at most one head

(iii) at least one head.

11)If A and B are events defined on Ω then prove that,

P(A'/B)=1-P(A/B), P(B)>0

9) Explain the following term with example.

a) Sample space

b) Mutually exclusive events

10) Define Poisson distribution. Find its mean.

11) If A and B are events defined on Ω then prove that,

P(A'/B)=1-P(A/B), P(B)>0.

12) Define C.D.F and state it's any four properties.

13) Let $S=\{e_1, e_2,e_3\}$ be a sample space associated with certain experiment.

If $P(e_1)$=K, $P(e_2)=2K^2$,$P(e_3)= K^2$+K then find the value of K.

14)Define the power set. Write the power set for the experiment os tossing two coins together

15) Define Independence of two events and prove that, A' and B are independent.

16)With usual notations, prove that

i)P(∅)= 0

ii)$0\leq P(A) \leq 1$

17)Define the following term

i) Independence of two events

ii) Pairwise independence of three events

iii) Complete independence of three events

18)A⊆B then prove that P(A)≤ P(B)

19) Define Binomial distribution. Find its mean.

20)State & prove additive property of Binomial distribution.

21) State & prove additive property of Poisson distribution.

22)With usual notations, prove that

i)P(∅)= 0

ii)$P(A^c)$=1-P(A)