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Q1. Let A and B be independent events defined on the same sample space such that $P(A \cup B) = 0.6$ and $P(B) = 0.2$. Then

(1) P(A) =
- (A) 0400
- (B) **0.500**
- (C) 0.050
- (D) 0.200

(2) P(B | A) =
- (A) **0.200**
- (B) 0.900
- (C) 0.500
- (D) 0.05 0

(3) P(B^C | A) =
- (A) 0400
- (B) **0.800**
- (C) 0.0200
- (D) 0.0.120

Q2. The following table shows the population of mentally weak children classified by the level of weakness and how often hey misunderstand an activity.

Level of weakness	Misunderstands an activity Rarely (R)	Sometimes (S)	Often O)
Slight (G)	65	75	10
Moderate (M)	98	68	84
Severe (V)	12	32	56

If one child is randomly selected from the population then,

(4) the probability that the child has moderate weakness if we know that he or she rarely misunderstands an activity is:
- (A) 046
- (B) **0.56**
- (C) 0.350
- (D) 0.70

(5) if we know that the child has not Were weakness, then the probability that the child rarely misunderstands an activity is
- (A) 0.0437
- (B) 0.0475
- (C) 0.4075
- (D) 0.4375

(6) P (M | O) =
- (A) **05600**
- (B) 0.1680
- (C) 0.3360
- (D) 0.6320

(7) the events G and O are :
- (A) disjoint
- (B) independent
- (C) dependent
- (D) Non of these

Q3. A factory has three assembly lines A, B, and C. Each line makes the same part. 50% of parts produced by the factory come off of assembly line A, 30% come off of assembly line B, and 20% come off of assembly line C. Finished parts can be either defective or not. It is known that 0.4% of the parts from line A are defective, 0.6% of the parts from line B are defective, and 1.2% of the parts from line C are defective.

(8) The probability of selecting a defective part is equal to:
- (A) 0.323
- (B) 0.290
- (C) 0.387
- (D) **0.006**

(9) Suppose that we are holding a defective part in our hand the probability that it t came from assembly line A
- (A) 0.323
- (B) 0.290
- (C) 0.387
- (D) **0.006**

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Q4. A discrete random variable X has a cumulative distribution function (CDF), F(x) as:

$$F(x)=\begin{cases}0 & for\ \ x<0\\ 1/6 & for\ \ 0\le x<1\\ 1/2 & for\ \ 1\le x<2\\ 5/6 & for\ \ 2\le x<3\\ 1 & for\ \ x\ge 3\end{cases}$$ So,

(10) $P(X>2.5)$ is

- (A) 4/6
- (B) 3/6
- (C) 1/6
- (D) **2/6**

(11) $f(2)=P(X=2)$ is

- (A) **2/6**
- (B) 4/6
- (C) 1/6
- (D) **3/6**

(12) $P(0<X<3)$ is

- (A) 1/3
- (B) 1/2
- (C) 1/6
- (D) **2/3**

Q5. If the pdf of the continuous random variable X having the form :

$$f(x)=\begin{cases}0.25\,x^3 & 0<X<2\\ 0 & otherwise\end{cases}$$

Then:

(13) $P(X\le 0.50)=...$

- (A) 0.1250
- (B) 0.8300
- (C) 0.2500
- (D) **0.0039**

(14) $P(0.3<X\le 1.5)=...$

- (A) 0.1250
- (B) 0.2500
- (C) **0.8300**
- (D) 0.0039

(15) the mean value of the random variable X is

- (A) 0.800
- (B) 3.200
- (C) 1.100
- (D) **1.600**

(16) and $E(X^2)$ will be

- (A) 0.800
- (B) 1.100
- (C) 2.512
- (D) **3.200**

(17) while the standard deviation of the random variable X will be:

- (A) **0.800**
- (B) 3.200
- (C) 1.100
- (D) 1.600

Q6. If the pdf of the random variable X is given by $f(x)=\begin{cases}\frac{3}{2}\sqrt{x} & 0<x<1\\ 0 & otherwise\end{cases}$, and

$E(X)=0.6\ \ and\ \ \sigma^2=0.06857$,and let us to define the random Y = 5 X – 0.5

(18) the expected value of Y will be

- (A) 70.50
- (B) 3.500
- (C) 3
- (D) **2.500**

(19) $E(Y^2)$ is

- (A) 70.50
- (B) 13.9643
- (C) 13.7143
- (D) **7.9643**

(20) the standard deviation Y will be

- (A) 1.7143
- (B) 6.0465
- (C) 6.5465
- (D) **1.3093**

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Q7. Question No. 7:
Let X be a continuous random variable with probability density function is given by $f(x)\begin{cases} c(1-x), & 0<x<1, \\ 0, & otherwise \end{cases}$

(21) The values of c is
- (A) 1/4
- (B) 2
- (C) 1/2
- (D) 1

(22) $E(X)=$
- (A) 1/4
- (B) 1/3
- (C) 9/4
- (D) 1/2

(23) $Var(X)=\sigma^2=$
- (A) 1/18
- (B) 1/9
- (C) 1/27
- (D) 1/3

(24) $P(X=0)=$
- (A) 1
- (B) 0
- (C) 1/2
- (D) 1/6

(25) $P(1/5<X<1)=$
- (A) 1/24
- (B) 10/24
- (C) 15/25
- (D) 16/25

(26) $P(|X-\mu|<2\rho)=$
- (A) 0.76
- (B) 0.96
- (C) 0.90
- (D) 0.82

(27) By using Chebyshev's theorem, then $P(|X-\mu|<2\rho)=$
- (A) $\leq 1/4$
- (B) $\geq 10/4$
- (C) $\leq 3/4$
- (D) $\geq 3/4$

Q8. If X and Y are two **independent** random variables defined such that :
$E(X)=10,\ E(Y)=15,\ V(X)=9,\ \sigma_y=4$
if U = 3X + 2Y – 5 Then

(28) E(U) =
- (A) 145
- (B) 109
- (C) **65**
- (D) 2500

(29) V(U) =
- (A) **145**
- (B) 109
- (C) 65
- (D) 2500

(30) E(X^2) =
- (A) 0.1250
- (B) **109**
- (C) 65
- (D) 2500

THE END

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