

الساعة 10:00 – 11:00

الأحد ١٤٣٦ / ٥ / ١٧ هـ

اسم الطالبة

رقم الطالبة:

رقم الشعبة:

رقم التسلسل:

But your answer below

Passage	1	2	3	4	5	6	7	8	9	10
Answer										

Passage	11	12	13	14	15	16	17	18	19	20
Answer										

Passage	21	22	23	24	25	26	27
Answer							

Good luck**Dr. Saba**

Question (1):

The cumulative distribution function of a continuous r.v. Y is given by:

$$F(y) = \begin{cases} 0, & y \leq 2 \\ 1 - \frac{4}{y^2}, & y > 2 \end{cases}$$

1. $P(Y \leq 5) =$

- (a) 0 (b) 4/25 (c) 21/25 (d) 19/25 (e) None of these

2. The p.d.f of Y is given by:

(a) $f(y) = \begin{cases} \frac{8}{y^3}, & y > 2 \\ 0 & o.w \end{cases}$ (b) $f(y) = \begin{cases} 1 - \frac{8}{y^3}, & y > 2 \\ 0 & o.w \end{cases}$ (c) $f(y) = \begin{cases} \frac{8}{y^3}, & y \leq 2 \\ 0 & o.w \end{cases}$ (d) $f(y) = \begin{cases} 1 - \frac{8}{y^3}, & y < 2 \\ 0 & o.w \end{cases}$

3. Let $f(x) = \frac{cx}{3}$, $0 < x < 3$ is the p.d.f of X then, the value of c must to be equal

- (a) 3 (b) 9 (c) 1/3 (d) 2/3 (e) None of these

For the following probability mass function of the discrete random variable X ,

4. $P(2 < X \leq 4)$

- (a) 0.25 (b) 0.00 (c) 0.55 (d) 1.00 (e) none of these

5. The expected value of $X =$

- a) 4.25 b) 15.10 c) 2.65 d) 10.23 (e) none of these

x	$f(x)$
1	0.20
2	0.25
3	0.25
4	0.30

Question (2):

Let the moment generating function of a r.v. X in the expanded form is given by:

$$M_X(t) = 1 + \frac{6t}{4} + \frac{14t^2}{8} + \frac{36t^3}{24} + \frac{98t^4}{96} + \dots$$

6. The variance of X ,

- (a) 0 (b) 5/4 (c) 1/2 (d) 3 (e) None of these

If $M_{X+Y}(t) = \left(\frac{2}{2-t}\right)^3$, $t < 2$ and $M_X(t) = \left(\frac{2}{2-t}\right)$, $t < 2$ and X and Y independent, then

7. $M_Y(t) =$

- (a) $\left(\frac{2}{2-t}\right)$, $t < 2$ (b) $\left(\frac{2}{2-t}\right)^2$, $t < 2$ (c) $\left(\frac{1}{1-t}\right)$, $t < 1$ (d) None of these

8. $M_{-3X+2}(t) =$

- (a) $\frac{2e^t}{2-3t}$, $t < 2/3$ (b) $\frac{2e^{2t}}{2+3t}$ (c) $\frac{2e^{2t}}{1-t}$, $t < 1$ (d) None of these

Question (3):

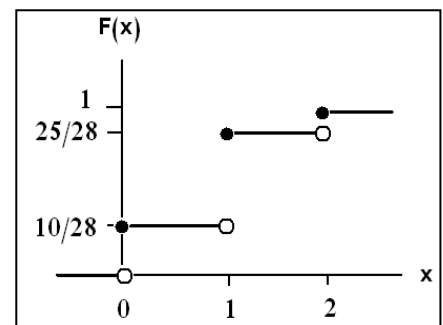
Suppose that the continuous random variable Y has the following probability density function

$$f(y) = \begin{cases} 2e^{-2y}; & y > 0 \\ 0; & \text{o.w} \end{cases}$$

9. $P(Y = 3) =$
 (a) 1 (b) 0.5 (c) 0 (d) 0.11 (e) None of these
10. $F(Y),$
 (a) $(1 - e^{-2y})$ (b) $(e^{-2y} - 1)$ (c) e^{-2y} (d) $(1 + e^{-2y})$ (e) None of these
11. $P(2 < Y < 3) =$
 (a) $(e^{-4} + e^{-6})$ (b) $(e^{-4} - e^{-6})$ (c) (e^{-10}) (d) $(1 - e^{-10})$ (e) None of these
12. The mean of Y is
 (a) $1/2$ (b) 2 (c) 1 (d) e^{-2} (e) None of these
13. The moment generating function $M_Y(t)$ is given by
 (a) $\frac{2}{2-t}, t \neq 2$ (b) $\frac{2}{t-2}, t \neq 2$ (c) e^{-t} (d) $3 - t$ (e) None of these
14. If X is a r.v. independent of Y , then $Var(X^3 - 3e^Y - 3) =$
 a) $Var(X^3) - 3Var(e^Y)$ b) $Var(X^3) - 9Var(e^Y)$ c) $Var(X^3) + 9Var(e^Y)$

According to the following graph of CDF of a discrete r.v

15. $P(X \leq 1) =$
 (a) $3/28$ (b) $10/28$ (c) $25/28$
 (d) 1 (e) None of these
16. $P(X = 2) =$
 (a) $3/28$ (b) $10/28$ (c) $25/28$ (d) 1
 (e) None of these

**Question (4)**

In a certain population, it is known that 30% of the them have two jobs. Let $X =$ number of people who have two jobs. If a sample of 15 people of this population are selected randomly, then

17. The probability distribution formula of the random variable X , $P(X = x)$ is given by
 (a) $\binom{15}{x} 0.3^x 0.7^{15-x}, x = 1, \dots, 15$ (b) $\binom{15}{x} 0.3^x 0.7^{15-x}, x = 0, 1, \dots, 15$
 (c) $\binom{15}{x} 0.3^{15-x} 0.7^x, x = 0, 1, \dots, 15$ (d) $0.3^x 0.7^{1-x}, x = 0, 1,$
 (e) $0.7^x 0.3^{1-x}, x = 0, 1,$
18. The probability that 5 people have two jobs
 (a) 0.876 (b) 0.995 (c) 0.667 (d) 0.206 (e) None of these
19. The variance of X is
 (a) 3.15 (b) 5.14 (c) 15 (d) 4.50 (e) None of these

Question (5):

The **average** of traffic accidents in a certain street is **6** accidents per **month**. Let the random variable X =the number of traffic accidents per **month**.

(*) For any given **month** in this street:

20. $P(X=3)$

- (a) 0.09 (b) 0.94 (c) 0.68 (d) 0.43 (e) None of these

21. The **mean** of the random variable is

- (a) 1/30 (b) 30 (c) 6 (d) 1/6 (e) None of these

(**) For any given **2 months** in this street:

22. The probability that **exactly 6** accidents will occur is

- (a) 0.23 (b) 0.21 (c) 0.03 (d) 0.12 (e) None of these

23. The **variance** of the random variable is

- (a) 5 (b) 6 (c) 2 (d) 12 (e) None of these

24. If the probability is 0.4 that an application for a driver's license will pass the road test on any given try, what is the probability that an application will finally pass the test on the fifth try

- (a) 0.15 (b) 0.16 (c) 0.08 (d) 0.05 (e) None of these

25. If it is assumed that **3%** of the units of a specific process will be rejected, then what is the probability that the 20th unit observed will be the 3rd rejected unit?

- (a) 0.0028 (b) 0.1463 (c) 0.2340 (d) 0.0540 (e) None of these

A random committee of size 4 is selected from 3 men and 4 women's. Let the random variable X representing the number of women's on the committee, then

26. The **range of the r.v. X** is

- (a) 0,1,...,4 (b) 1,2,...,4 (c) 1,2, ...,7 (d) 3,4,...,7 (e) None of these

27. $P(X \leq 3)$

- (a) 0.34 (b) 0.97 (c) 0.12 (d) 0.3 (e) None of these