جامعة الملك سعود
كلية العلوم
قسم الإحصاء وبحوث العمليات

الاختبار الفصلي الثاني
الفصل الدراسي الثاني 1438/1437
مقرر 215 احص

الخميس 16 / 7 /1438 هـ	الساعة : 12– 1

نمـــــــوذج

(B)

اسم الطالبة : --

رقم الطالبة : --

رقم التسلسل : --

أستاذة المقرر: --

ملاحظات :

1) لأسئلة الاختياري سيتم تصحيح ورقة الإجابة فقط (التصحيح الآلي) فقط ولن يتم النظر إلى ورقة الأسئلة من الداخل .

2) عدد أوراق الامتحان هو 4 صفحات مع الغلاف الخارجي.

3) يلزمك كتابة أسمك على كلا الورقتين (الأسئلة و ورقة التصحيح الآلي).

دعواتنا لكم بالتوفيق

Q1: Choose the right answer (The first 16 questions are not related to each other)

1. If $M_X(t) = \frac{0.2e^t}{1-0.8e^t}$. Then X has the distribution

a) Geom(0.8)	b) Bin(8,0.2)	c) Poisson(0.8)	d) NBin(1,0.2)

2. Let $M_X(t) = e^{2t^2}$, then X has

a) U(0,2)	b) Gamma(4,2)	c) Poisson(2)	d) N(0,2)

3. If $X_1 \sim N(0.5,1.5)$ and $X_2 \sim N(0.5, 2.5)$ then

a) X_1, X_2 have the same shape and in the same location.
b) X_1, X_2 have the same shape but in different location.
c) X_1, X_2 have the different shape but in the same location.
d) X_1, X_2 have the different shape and in different location.

4. In a game, the player decided to play until he lose 5 times. The probability of losing any game is 0.5071. Let X the number of games until the game is stopped. Then the possible values of X are

a) 0,1,2,3,4,5.	b) 1,2,3,4,5	c) 1,2,3,...	d) 5,6,7,...

5. In the experiment of flipping a fair coin several times. The random variable X which represent the number of heads occurs has a binomial distribution with mean 5. Then the number of trials n is

a) 10	b) 5	c) 0.5	d) 0.25

6. Let $X \sim H(10,3,7)$. Calculate $P(X = 3) =$

a) $\frac{\binom{10}{3}\binom{7}{0}}{\binom{10}{3}}$	b) $\frac{\binom{3}{0}\binom{7}{3}}{\binom{10}{3}}$	c) $\frac{\binom{7}{0}\binom{3}{3}}{\binom{10}{3}}$	d) $\frac{\binom{7}{3}\binom{10}{0}}{\binom{10}{3}}$

7. $\int_0^1 x^4(1-x)^2 dx =$

a) 0.0095	b) 0.96	c) 0.0003	d) 0.0122

8. Let X has a discrete uniform distribution where $f(3) = 0.2$. Then the number of possible values of X is

a) 3	b) 20	c) 10	d) 5

9. If X has exponential distribution. Then $P(X > 8|X > 2) =$

a) $P(X > 8)$	b) $P(X > 2)$	c) $P(X > 6)$	d) $p(X < 8)$

10. Let $f(x) = \left(\frac{1}{4}\right)\left(\frac{3}{4}\right)^{x-1}$; $x = 1,2,3,....$ Then $P(X = 3) =$

a) 0.2335	b) 0.0352	c) 0.1875	d) 0.1406

11. Let the continuous random variable $X \sim$Uinform$(-1,1)$. Find $P(X < 0) =$

a) 0.23	b) 0.35	c) 0.5	d) 0.98

12. When the population size is big such that $M > 20n$, "where n is the sample size", then the Hypergeometric distribution can be approximated by

a) Normal Distribution	b) Binomial Distribution	c) Poisson Distribution	d) Exponential Distribution

13. The number of patients in a clinic has Poisson distribution with standard deviation 3. Then $f(x) =$

a) $\frac{e^{-9}9^x}{x!}$	b) $\frac{e^{-3}3^x}{x!}$	c) $\frac{e^{-\frac{1}{3}}\left(\frac{1}{3}\right)^x}{x!}$	d) $\frac{e^{-\frac{1}{9}}\left(\frac{1}{9}\right)^x}{x!}$

14. If $X \sim Normal(\mu = 4, \sigma = 20)$, then the median of $Z = \frac{X-4}{20}$ is

a) 20	b) 4	c) 0	d) 4.47

15. Let T has t-distribution with 9 degrees of freedom. Find $P(T < 1.383) =$

a) 0.90	b) 0.95	c) 0.975	d) 0.995

16. If $X \sim Beta(2,3)$, then the mean of X is

a) 1.5	b) 0.08	c) 0.4	d) 1

Q2: Use approximation for the following

17. Suppose that a sample of n = 2100 tires of the same type are obtained at random from an ongoing production process in which 0.95 of all such tires produced are not defective. What is the probability that 2000 or more tires will not be defectives? (Use normal approximation)

a) 0. 6748	b) 0.9808	c) 0.95	d) 0.3264

18. Suppose 4% of the tires manufactured at a particular plant are defective. Using the Poisson approximation to the binomial, the probability of obtaining exactly one defective tire from a sample of 150 is calculated as

a) 0. 9851	b) 0.0384	c) 0.0025	d) 0.0149

Q3: Summer rainfall totals X in a section of the Midwest have Gamma distribution with α = 3.0 and β = 0.5.

19. Find the mean of the rainfall totals.

a) 9	b) 1.5	c) 0.5	d) 6

20. $P(X \leq 10) =$

a) 0.997	b) 0.953	c) 0.918	d) 0.875

21. This distribution equivalent to

a) $Exp(0.5)$	b) $Gamma(0.5,2)$	c) χ^2_6	d) $Beta(2,0.5)$

Q4: Proof

22. Let $X \sim Gamma(\alpha, \beta)$. proof that $M_X(t) = \left(\frac{\beta}{\beta - t}\right)^{\alpha}, t < \beta$.

23. Let $X \sim Poisson(\lambda)$, proof that $E(X) = \lambda$. Hint $e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!}$.