Department of Statistics

& Operations Research

College of Science, King Saud University

STAT 324, Test II

Semester II, 1432 – 1433 H

Student Name:			
Student Number:		**Section Number:**	
Teacher Name:		**Attendance Number**	

- Mobile Telephones are not allowed in the classrooms.
- Time allowed is 90 minutes
- Answer all questions.
- Choose the nearest number to your answer.
- WARNING: Do not copy answers from your neighbours. They have different questions forms.
- For each question, **put the code in capital letter** of the correct answer, in the following table, beneath the question number:

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

21	22	23	24	25

The probability that a certain device is non-defective is 0.7. If three independent devices are investigated, then

1) the probability that none is non-defective:

(A) 0.001	(B) 0.027	(C) 0.008	(D) 0.7	(E) 0.49

2) the probability that at most one is defective:

(A) 0.784	(B) 0.243	(C) 0.896	(D) 0.652	(E) 0.972

3) the mean number of non-defective devices is:

(A) 2.4	(B) 2.7	(C) 3.6	(D) 1.2	(E) 2.1

A consulting engineer receives, on average, 4 requests per week. Assume that the number of requests can be modeled as a Poisson process.

4) The probability that he will receive at least one request per week is:

(A) 0.9502	(B) 0.7769	(C) 0.8647	(D) 0.9817	(E) 0.33

5) The probability that he will receive four requests per 2 weeks is:

(A) 0.1945	(B) 0.1339	(C) 0.125	(D) 0.168	(E) 0.0573

6) The expected number of requests in 4 weeks is:

(A) 20	(B) 16	(C) 15	(D) 12	(E) 3

Among a department store's 16 delivery trucks, 6 have worn brakes. If 8 trucks are randomly picked for inspection, then:

7) the probability that the sample will include at least two trucks with worn brakes is:

(A) 0.5110	(B) 0.9406	(C) 0.3570	(D) 0.8590	(E) 0.7154

8) the expected value of the number of trucks with worn brakes is:

(A) 3.5	(B) 2.5	(C) 4	(D) 2.0	(E) 3.0

Let X be a normal random variable with mean μ and variance 4. Suppose that $P(X>2)=0.4013$ then

9) $\mu =$

(A) 3.5	(B) 2.5	(C) 1.5	(D) 0.5	(E) 4.5

The length of time, in weeks, between two breakdowns of a computer has the following probability density function

$$f(x) = 0.5e^{-0.5x}, x > 0$$

10) The probability that the computer will breakdown before 2 weeks.

(A) 0.45	(B) 0.55	(C) 0.63	(D) 0.70	(E) 0.33

11) The average time of breakdowns

(A) 2.00	(B) 2.50	(C) 5.00	(D) 1.67	(E) 3.33

The elongation of a steel bar under a particular load has been established to be normally distributed with a mean of 0.08 inch and a standard deviation = 0.01 inch. The probability that the elongation is

12) above 0.04 inch;

(A) 0.023	(B) 0.841	(C) 1.000	(D) 0.159	(E) 0.977

13) between 0.025 and 0.065 inch.

(A) 0.927	(B) 0.159	(C) 0.067	(D) 0.691	(E) 0.422

The execution time in minutes of certain report is random variable following the uniform distribution on (0, 3).Then the

14) Mean execution time is

(A) 2.5	(B) 3.0	(C) 2.0	(D) 1.5	(E) 6.0

15) Probability that the execution time takes more than 2 minutes is

(A) 0.40	(B) 0.50	(C) 0.25	(D) 0.20	(E) 0.33

It was noted that the number of days taken to finish a certain project by men has the mean $\mu_M = 15$ days and standard deviation $\sigma_M = 7$ days; while by female they are $\mu_F = 13$ days and $\sigma_F = 6$ days. In a nationwide survey, suppose 100 men and 50 female are sampled. Then:

16) The mean of the sampling distribution of the sample mean $\bar{X}_M$

(A) 15	(B) 12	(C) 6	(D) 13	(E) 7

17) The standard error of the sample mean $\bar{X}_M$ is:

(A) 0.7	(B) 0.60	(C) 0.849	(D) 0.49	(E) 0.72

18) The probability $P(\bar{X}_M > 14)$ is

(A) 0.9525	(B) 0.9236	(C) 0.0475	(D) 0.0091	(E) 0.0764

19) The mean of the sampling distribution of the difference $\bar{X}_M - \bar{X}_F$ is

(A) 1	(B) -3	(C) -1	(D) -2	(E) 2

20) The standard error of the sampling distribution of the difference $\bar{X}_M - \bar{X}_F$ is:

(A) 1.21	(B) 1.158	(C) 0.985	(D) 1.1	(E) 1.341

21) The probability $P(\bar{X}_M < \bar{X}_F + 3)$ is

(A) 0.9997	(B) 0.1814	(C) 0.9788	(D) 0.8051	(E) 0.8186

Two samples of sizes n_1=12 and n_2=6 were drawn from $N(11,\sigma^2)$ and $N(9,\sigma^2)$, respectively. If the sample variances S_1^2=9.5 and S_2^2 = 11.3, then:

22) which of the following statistics follows the distribution t_{16}:

(A) $\frac{(\bar{X}_1-\bar{X}_2)-2}{1.636}$	(B) $\frac{(\bar{X}_1-\bar{X}_2)-2}{1.586}$	(C) $\frac{(\bar{X}_1-\bar{X}_2)+2}{1.586}$	(D) $\frac{(\bar{X}_1-\bar{X}_2)+2}{1.636}$	(E) Non correct

Let $P_A = 0.1$ be the proportion of defective items in a production *A*. A sample of size $n_A = 90$ is drawn at random and $\hat{p}_A$ is the proportion of defectives in the sample then:

23) The standard error of $\hat{p}_A$ is

(A) 0.03764	(B) 0.15	(C) 0.03162	(D) 0.03571	(E)0.03333

24) The probability that $\hat{p}_A$ will be at most 0.12 is

(A) 0.2119	(B) 0.3476	(C) 0.7357	(D) 0.2005	(E) 0.2643

If the defectives in another production *B* has the proportion $P_B = 0.13$ and a sample of this production of size $n_B = 140$ is drawn and $\hat{p}_B$ is the proportion of defectives in the sample then:

25) The standard error of the difference $\hat{p}_B - \hat{p}_A$ is

(A) 0.044049	(B)0.047165	(C) 0.045628	(D) 0.042519	(E) .043126