 كلية الهندسة بحلوان	Dept/Division : Mechanical Engineering Dept/Industrial Academic level: 2 nd year Semester: 1 st semester (2015-2016) Course code & title: Statistics and Probability Theory Instructor: Dr. Haitham Abbas Total mark: 70 Time allowed: 3 Hours سوف توزع عليكم جداول المعادلات و التوزيع الطبيعي	
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Answer all questions

Question 1 (16 Marks)

- a. Define the basic characteristics of the Poisson distribution.
- b. Plot the probability mass function of a Poisson distribution with $\lambda = 2.25$ [Take $x =$ from 0 to 13].
- c. A discrete random variable x follows a negative binomial distribution with $r = 2$ and $p = 0.10$:
 - i. Determine and plot the probability mass function of x .
 - ii. Determine and plot the cumulative distribution function of x .
 - iii. What are the mean and the standard deviation of x ?
- d. Explain the effects of the mean and standard deviation values on the normal distribution curve.

Question 2 (22 Marks)

- a. The number of cracks in a section of interstate highway that are significant enough to require repair is assumed to follow a Poisson distribution with a mean of two cracks per mile.
 - i. What is the probability that there are no cracks that require repair in 5 miles of highway?
 - ii. What is the probability that at least one crack requires repair in mile of highway?
 - iii. What is the mean distance until the detection of the first crack?
- b. A manufacturer of a consumer electronics product expects 2% of units to fail during the warranty period. A sample of 500 independent units is tracked for warranty performance.
 - i. What is the probability that none fails during the warranty period?
 - ii. What is the probability that more than two units fail during the warranty period?
 - iii. What is the probability that 4 or more units must be checked in order to discover only one failed item during the warranty period?
 - iv. What is the mean number of units that must be checked in order to detect 5 defective items?
- c. From 500 customers, a major appliance manufacturer will randomly select a sample without replacement. The company estimates that 125 of the customers will provide useful data. If this estimate is correct, what is the probability mass function of the number of customers that will provide useful data?
 - i. Assume that the company samples 5 customers.
 - ii. Assume that the company samples 10 customers.

انظر الصفحة التالية

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Question 3 (20 Marks)

- a. The thickness of photoresist applied to wafers in a semiconductor is uniformly distributed between 0.2050 and 0.2150 micrometers.
 - i. Determine the cumulative distribution function of photoresist thickness.
 - ii. Determine the proportion of wafers that exceeds 0.2125 micrometers in photoresist thickness.
 - iii. What thickness is exceeded by 10% of the wafers?

- b. The life of a semiconductor laser at a constant power is normally distributed with a mean of 7000 hours and a standard deviation of 600 hours.
 - i. What is the probability that a laser fails before 5000 hours?
 - ii. What is the life in hours that 95% of the lasers exceed?
 - iii. If three lasers are used in a product and they are assumed to fail independently, what is the probability that all three are still operating after 7000 hours?

- c. The fill volume of an automated filling machine used for filling cans of carbonated beverage is normally distributed with a mean of 12.4 fluid ounces and a standard deviation of 0.1 fluid ounce.
 - i. What is the probability a fill volume is less than 12 fluid ounces?
 - ii. If all cans less than 12.1 or greater than 12.6 ounces are scrapped, what proportion of cans is scrapped?
 - iii. Determine specifications that are symmetric about the mean that include 99% of all cans.

Question 4 (12 Marks)

- a. An engineer who is studying the tensile strength of a steel alloy intended for use in golf club shafts knows that tensile strength is approximately normally distributed with $\sigma = 60$ psi. A random sample of 12 specimens has a mean tensile strength of $\bar{x} = 3450$ psi. Test the hypothesis that the mean strength is 3500 psi. Use $\alpha = 0.01$.

- b. Consumer Products Company is formulating a new shampoo and is interested in foam height (in millimeters). Foam height is approximately normally distributed and has a standard deviation of 20 millimeters. The company wishes to test $H_0: \mu = 175$ millimeters versus $H_0: \mu \neq 175$ millimeters, using the results $n = 10$ samples.
 - i. Find the type I error probability α if the acceptance region is $172.5 \leq \bar{x} \leq 177.5$.
 - ii. What is the probability of type II error if the true mean foam height is 176.5 millimeters?

*Good Luck
Dr. Haitham Abbas*



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Mechanical Dept. Industrial Eng Division.

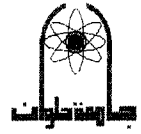
Academic level: 2nd year Industrial **Semester:** Jan 2016

Course code & title: MEC6214 **Jigs and Fixtures Design**

Instructor: Prof .Osama M Dawood and Dr. Hussein Mohamed

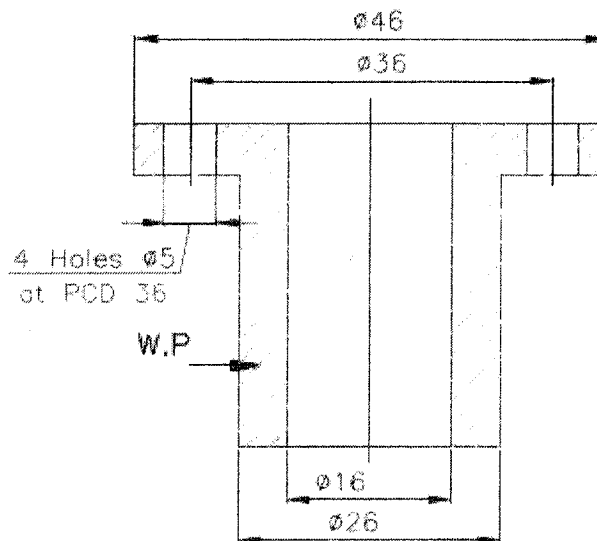
Total mark: 100 mark

Time allowed: 3 hrs



Answer the following requirements:

- Q1-** In which cases the “Flat Locators”, “Adjustable Locators”, “V-Locators” be used, sketch each of them. [10 Marks]
- Q2-** Sketch the sliding clamp with heel pin. [10 Marks]
- Q3-** In case of drilling on inclined surface, what is the suitable guide bush which will be suitable for this kind of machining, Sketch your selection. [10 Marks]
- Q4-** For the following workpiece, Design the complete suitable jig,
- (a) If the surface reference and machining mark related to the inner diameter $\Phi 16$. [35 Marks]
- (b) If the surface reference and machining mark related to the outer diameter $\Phi 26$. [35 Marks]



With our best wishes Prof .Osama M Dawood and Dr. Hussein Mohamed



كلية الهندسة بحلوان

Dept/Division : Production Eng.

Academic level: Second

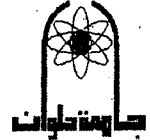
Semester: First 2015/2016

Course code & title : ELC 5212 / Electronic Engineering

Instructor: Dr/ Fathy Z. Amer & Dr. Essam

Total mark: 90 marks

Time allowed: 3 hrs



Instructions: Solve each part in separated papers

Answer the following questions

Question1

(Mark 25)

a.1. Add the BCD numbers 01110011+ 10101011, and add Df + CA

Convert to BCD numbers: 10010111000010000111

2. Convert each of the following: $(359.875)_{10} = (?)_8$, $(650.624)_{10} = (?)_{16}$

b. Sketch the output wave form for the circuit in Figs. 1

c. Convert SOP and POS into standard SOP and standard POS.

POS. a. $AB + \bar{A}BC + A\bar{C}\bar{D}$ b. $(A + \bar{C})(A + B)$

d. Implement the expression: $X = (\bar{A} + \bar{B} + \bar{C})DE$ using NAND and NOR logics.

Question2

(Mark 20)

a. Use K-map to minimize the following expressions:

1. $(B + \bar{C} + D)(\bar{A} + B + C + \bar{D})(A + \bar{B} + \bar{C} + D)(\bar{A} + \bar{B} + C + D)(A + B + \bar{C} + \bar{D})$

2. $\bar{B}CD + ABC\bar{D} + ABCD + \bar{A}BC\bar{D} + ABC + ABC\bar{D} + ABCD + \bar{A}BC\bar{D} + \bar{A}BCD$

b. 1. Determine the output waveform for the BCD-to-decimal decoder circuit in Fig. 2.

2. For the adder in Fig. 3, determine the sum and output carry of the adder circuit.

c. 1. Define the function of: multiplexer and demultiplexer.

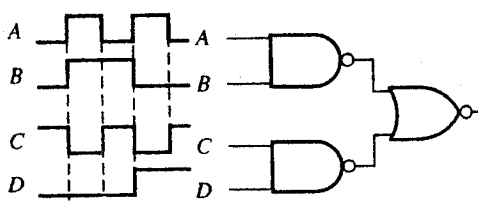


Fig. 1

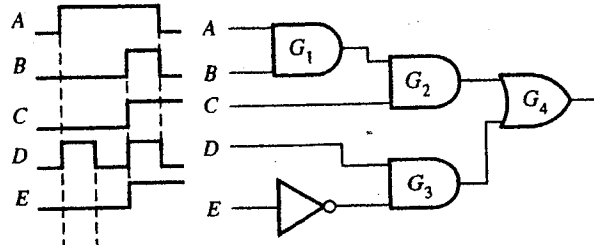
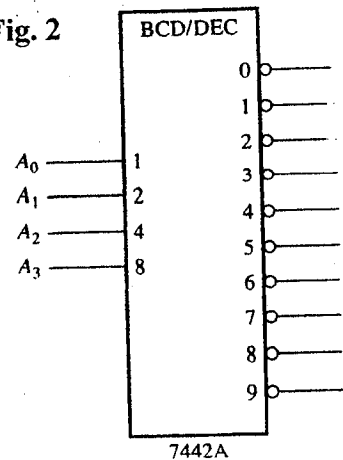
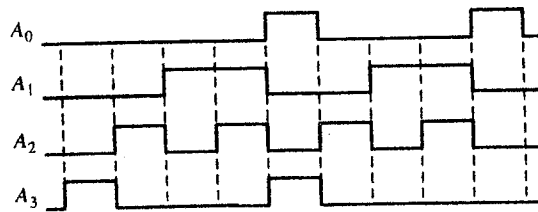


Fig. 2



P. T. O.

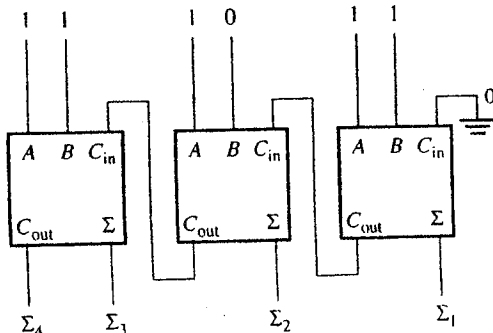

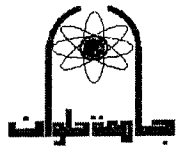


Fig. 3

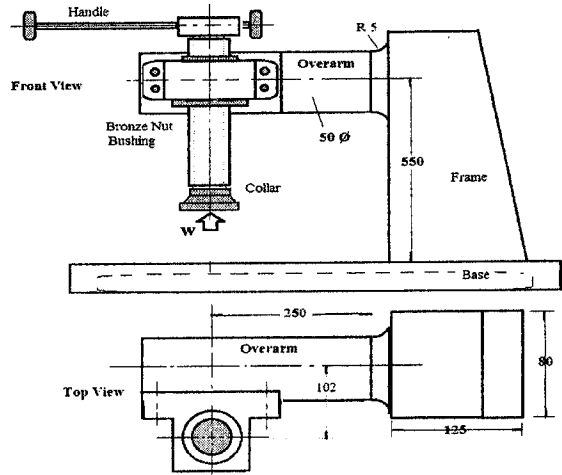
 Faculty of Engineering	Mechanical Engineering Department Course title: Machine Elements (Code: MEC 6213) Instructors: Prof. Dr. \ Abdelhay M. Abdelhay & Asst. Prof. Dr. \ Elsaid Elsaid Elgharib 2 nd Year Industrial Jan 21 st , 2016 Total mark: 100 Marks	 جامعة طرابلس
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Question # 1 (45 Marks [20+20+5])

A manual press of $W=36$ KN capacity with 480 mm maximum vertical travel distance.

It is required to **DESIGN**:

- The overarm according to the maximum Distortion Energy Failure Theory.
- The Square – thread *power screw* and its *Bronze Nut* and *Handle*.
- The *fit* between the 75 OD Bronze Nut Bushing in its Housing to ensure Rigidity.

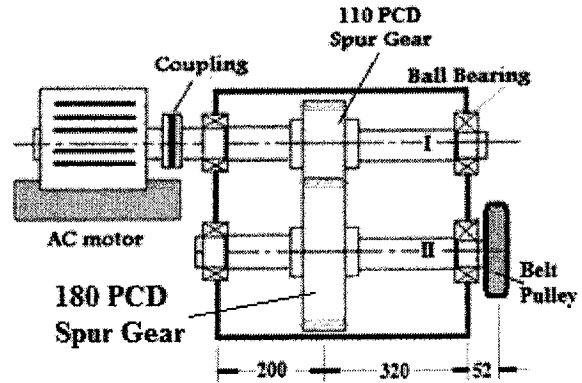


Question # 2 (30 Marks [20+10])

A single-stage gear Box is connected to an AC motor of 4.8 KW running at 1240 rpm. A Spur gear set of 20° pressure angle is transmitting power between Shaft I and II with the aid of rectangular keys.

It is required to do as follows:

- A complete design for **Shaft I**, according to The Maximum Shear Stress Failure Theory.
- A proper Key selection to be used on **Shaft I**, of 76 mm hub width.



Question # 3 (10 Marks)

A Construction Drawing for **Shaft II**; taking into account the principles of *DFM* and *DFA*.

Question # 4 (15 Marks)

A Steel bucket is used to left a weight of $W = 36$ KN upward. Lap joint is designed to attach its supporting side plate with the bucket walls, with 3 equally sized steel rivets **on each side**, as shown in figure.

For safe design of such joints against different failure modes, Determine the rivet size (d) if both the rivets and the plates are made from steel AISI 1015.

