

# UNIVERSITY OF ENGINEERING & TECHNOLOGY PESHAWAR

Department of Computer System Engineering, 7<sup>th</sup> Semester, Final Term Examination Fall 2018

## Professional Ethics (BSI-120)

Marks: 50

Time: 2hrs

Note: Understanding of the questions is part of the examination process; students are therefore reminded of their academic and ethical responsibility not to bother the invigilating staff for explanation of the paper/questions. All questions are compulsory. Your own viewpoint is most welcome, provided it accompanies valid arguments.

**Q1.** What is cyber bullying? Devise a code of ethics to address issues of cyber-crime particularly cyber bullying. (CLO-1) 2 (10)

**Q2.** "Give full measure and weight justly and defraud not men of their things, and act not corruptly in the land, making mischief." (Hood:85) 6

Despite the very clear commandments from the Almighty in the afore-cited Quranic verse, and PEC Institutionalized code of ethics what makes the students/academicians/researchers indulge in cheating and plagiarism. Share your own academic history as a case-study. (CLO-3) (10)

**Q3.** History has shown us that many engineering failures had their basis in ethical conflicts or in the containment of ethical issues. Explain in the light of the Chernobyl disaster and Three Mile Island tragedy. (CLO-2, Tax-2) (10)

**Q4.** Identify, and why you think the following are valued? (CLO-2, Tax-2) 2 (10)

- a) Principle of Natural Justice and Human rights
- b) What's ethical about the Contract-Law

**Q5.** "Whereas Allah enjoins upon His men to faithfully observe their trusts and their covenant." Describe the ethical implications of a contract particularly in professional life/undertakings. (CLO-2, Tax-2) 2 (10)

Good Luck



**University of Engineering and Technology, Peshawar**  
**Department of Computer Systems Engineering**

Mid Term Examination - Fall 2018 Semester

Tousiq Wigan 15PWCSE1366

Course Title: Control Systems

Max Marks: 25

Time Allowed: 2 hours

Total Pages: 2 (including this)

**INSTRUCTIONS:**

1. Write your name and registration number on the question paper; and fill all the details on answer sheet.
2. All questions are compulsory. There are total four questions. Any question attempted twice will be marked zero.
3. Please write the same question number while attempting it and do not renumber the questions yourself.
4. This paper is closed book. All answers must be supported by facts and calculations.
5. Use blue or black ink only. Any answer or part of answer written with pencil will be marked zero.

Student Name: ..... Tousiq Wigan ..... Registration No: ..... 15PWCSE1366 .....

The following formulas and equations might be helpful in solving the questions.

$$\mathcal{L}(\delta) = 1$$

$$\mathcal{L}(u(t)) = \frac{1}{s}$$

$$\mathcal{L}(tu(t)) = \frac{1}{s^2}$$

$$\mathcal{L}(t^n u(t)) = \frac{n!}{s^{n+1}}$$

$$\mathcal{L}(e^{(-at)}) = \frac{1}{s+a}$$

$$\mathcal{L}(\sin(\omega t)) = \frac{\omega}{s^2 + \omega^2}$$

$$\lim_{t \rightarrow \infty} f(t) = \lim_{s \rightarrow 0} sF(s)$$

$$G(s) = C(sI - A)^{-1}B + D$$

**✓ Question 1 (6 Marks):** Let's consider a stable system as follows:

$$G(s) = \frac{1}{(s+2)(s+3)(s+5)} \quad (1)$$

Substitute the value of  $G(s)$  given in Equation (1) in Figure 1, compute the transfer function  $\frac{Y(s)}{R(s)}$  from Figure 1 and is  $\frac{Y(s)}{R(s)}$  a stable transfer function.

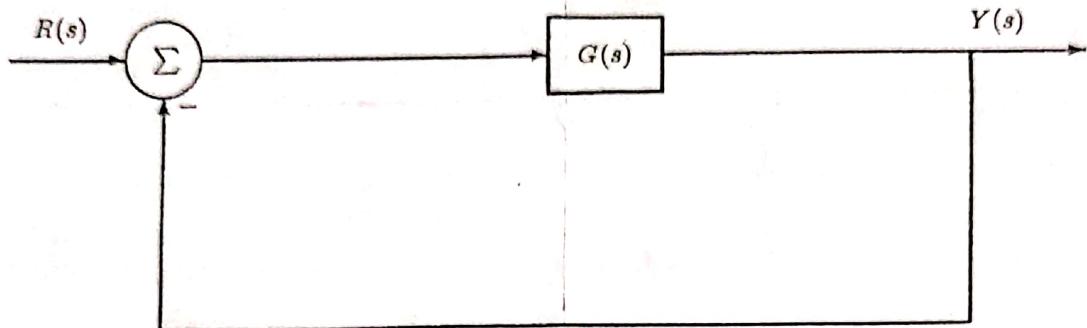


Figure 1: Figure to consider for Question 1 and Question 3

floatable not stable

**✓ Question 2 (6 Marks):** Find the range of values for gain  $K$  such that the transfer function,  $P(s)$ , is stable. ?

$$P(s) = \frac{K^2 - 15K}{s(s^2 + s + 1)(s + 2) + K}$$

**✓ Question 3 (6 Marks):** Consider the negative unity feedback system as shown in Figure 1 where  $G(s)$  is as follows:

$$G(s) = \frac{120(s+2)}{(s-3)(s+4)} \quad \begin{matrix} a = 0.26316 \\ b = \infty \\ c = \infty \end{matrix} \quad (2)$$

Substitute the value of  $G(s)$  given in Equation (2) in Figure 1, compute the steady-state errors if  $r(t) = 5u(t)$ ,  $r(t) = 5tu(t)$  and  $r(t) = 5t^2u(t)$  where  $u(t)$  represents the unit step signal.

**Question 4 (7 Marks)** Bicycles are convenient, environment friendly and efficient transportation devices. An interesting control problem is to stabilize a bicycle while riding it. A bicycle can be modeled by taking various parameters into account such as its geometry, tires, elasticities and the rider. If a bicycle is stabilized, then it can be ridden without hands. Considering the handlebar torque as the input, and the steering angle and tilt angle as the state-variables, assume we can obtain the following linearized state-space model of the system:

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ -0.5 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u$$

$$y(t) = [1 \ 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Compute the transfer function of the system and check if its a stable or unstable transfer function.

*The End of Question Sheet*



DEPARTMENT OF COMPUTER SYSTEM ENGINEERING  
UNIVERSITY OF ENGINEERING & TECHNOLOGY PESHAWAR  
CSE-4xxx Software Engineering | Fall 2018

Time allowed 2hrs      Mid-Term Examination      Total Marks = 25

**Note: Attempt all questions. This is an open book and open notes examination.  
Your answers should be concise and clear.**

**Q1) (CLO-1, PLO 1-3)**

Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems:

- A system to control anti-lock braking in a car
- ✓ A class attendance system.
- ✓ A university accounting system that replaces an existing system
- ✓ An interactive travel planning system that helps users plan journeys

(Marks 2+2+2+2=8)

**Q2) (CLO-1, 2 PLO 1-3-5-11)**

The University of Kinakuta (UoK) has decided to implement an electronic card system for its students, so that students can use their K-cards to access secure areas (e.g labs and residences), and also as a debit card, linked to an account into which students can deposit money, to be used to pay fees at locations on campus. For the initial release of the system, this will be limited to a few university fees: parking fees at campus parking lots, library fees at campus libraries, and equipment rental at the sports centre.

The system will keep a usage record for each K-card. Explain which model will be best to develop this system and how can the system ensure that it is secure and efficient. What problems do you see in this System?

(Marks 1+2+5=8)

**Q3) (CLO-1, 2 PLO 1-3-5-11)**

Consider an online reservation system for a bus company. The bus company includes several buses and realizes trips to different cities. Each bus is identified by its plate number and a separately assigned bus number. The trips are based on a predefined schedule and stop at predefined bus stations. Each bus can have only one trip per day. Each bus includes a driver and one hostess. For long trips, the bus will have breaks at service and rest areas. There are two types of trips, normal trips and express trips. Express trips do not stop at intermediate stations and get faster at the destination.

Seats can be reserved by customers on the web site of the bus company. The customer has the option to directly pay for the seat through the website. In that case, the seat cannot be cancelled (neither by the customer nor by the bus company). If the customer has not paid for the seat, the bus company can cancel the seat if the customer does not show up one hour before the trip. When the reservation is cancelled, the seat will become free and can be sold to another customer. Both the customer and the company staff must authenticate themselves for performing operations with the system.

Answer the following questions;

- 1) What SDLC model will be best to construct this system?
- 2) What are the Functional and Nonfunctional requirements of the system?
- 3) Describe the case in which a seat was reserved but got cancelled. How would you deal with refund policy on the seat?
- 4) Describe a scenario in which the luggage was exceeding the allotted size and you had to charge the passenger. What rate would you charge at?

**(Marks 1+2+3+3=9)**

# UNIVERSITY OF ENGINEERING & TECHNOLOGY PESHAWAR

Department of Computer System Engineering, 7<sup>th</sup> Semester, Mid Term Examination Fall  
2018

## Professional Ethics (BSI-120)

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y ✓ CSE A.E  
CSE B.E ✓ m

Q1 ✓ "Do the public owe duties to Engineers?" If they do, identify? Discuss in detail (10)

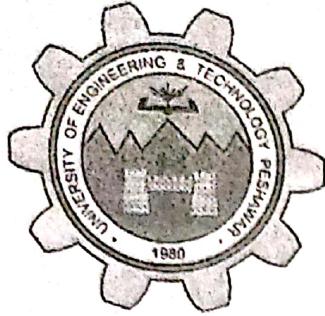
(CLO-2, Category- receiving)

Q2. Utilitarianism is close to the mindset of the engineer who is looking to maximize the good in technological progress. However such ethical judgments tend to be problematic. Why? Justify with valid examples (10)

(CLO-2, Category- valuing)

Q3. Answer the following. Your answer **should not exceed more than five lines.** (CLO-1/2, Category- responding) (5)

- a) Conflict of Interest?
- b) Professional Accountability?
- c) Social Control?
- d) Social Values vs Social Norms?
- e) Adherence to agreements vs Whistle blowing?



University of Engineering and Technology, Peshawar

Department of Computer Systems Engineering

Final Term Examination - Fall 2018 Semester

Course Title: Control Systems

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4. This paper is closed book. All answers must be supported by facts and calculations.
5. Use blue or black ink only. Any answer or part of answer written with pencil will be marked zero.

Student Name: Tousiq Wigan ..... Registration No: ISPLWC SEB 66 .....

The following formulas and equations might be helpful in solving the problems.

$$P = [B \ AB \ A^2B \ \dots \ A^{n-1}B]$$

$$Q = \begin{bmatrix} C \\ CA \\ CA^2 \\ \vdots \\ CA^{n-1} \end{bmatrix}$$

$$G(s) = C(sI - A)^{-1}B + D$$

✓ Question 1 - CLO2 - (15 Marks): Consider the following second order system:

$$\begin{aligned}\dot{x}(t) &= Ax(t) + Bu(t) \\ y(t) &= Cx(t).\end{aligned}$$

where

$$A = \begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} k_1 \\ k_2 \end{bmatrix}, \quad C = \begin{bmatrix} k_3 & k_4 \end{bmatrix}$$

general

$$\begin{aligned}k_1 &= k_2 \\ -k_3^2 - k_4^2\end{aligned}$$

Determine the range of values for  $k_1$ ,  $k_2$ ,  $k_3$  and  $k_4$  such that this system is controllable and observable.

Question 2 - (10 marks): Compute the state-space model for the circuit shown in Figure 1 and choose the voltage across resistor as output.

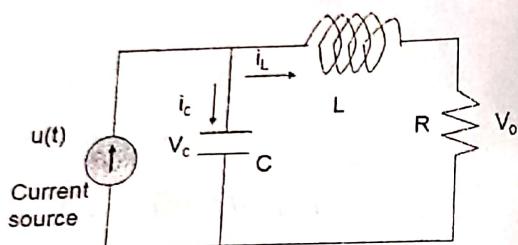


Figure 1: Figure to consider for Question 2

✓ Question 3 - (10 Marks): A system is described by the following matrix equations:

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 10 & 1 \\ 0 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u \quad (1)$$

and  $y = 2x_2$ . Determine if the system is controllable and observable.

$$\det(sI - (A - BK))$$

✓ Question 4 - (15 Marks): Obtain the transfer function  $T(s)$  if its zeros are located at origin and  $-2$ , and poles can be obtained from the following Routh Hurwitz Table. Determine if  $T(s)$  is stable or unstable transfer function.

$s^5$	1	11	28
$s^4$	0	23	12
$s^3$	6.4	0	0
$s^2$	23	b <sub>2</sub>	D <sub>3</sub>
$s^1$	3.535	C <sub>2</sub>	C <sub>3</sub>
$s^0$	-12	D <sub>2</sub>	D <sub>3</sub>

Unstable



DEPARTMENT OF COMPUTER SYSTEM ENGINEERING  
UNIVERSITY OF ENGINEERING & TECHNOLOGY PESHAWAR

CSE-403 Software Engineering | Fall 2019

Time allowed 2hrs      Mid-Term Examination      Total Marks = 25

This is a closed book and closed notes examination.

Q1)

(CLO-1)

Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems:

wave & fall

- A system to control anti-lock braking in a car
- A class attendance system.
- A university accounting system that replaces an existing system
- An interactive travel planning system that helps users plan journeys

(Marks=5)

Q2)

(CLO-1)

We want to implement a software development model for the placing of and payment for orders in the retail store scenario.... Which model is best and what can be the possible scenarios according to your understanding. You should consider a real world retail store to add clarity of concept to your answer.

(Marks=5)

Q3)

Limitation  
that's

(CLO-2)

confused

Discover ambiguities and omissions in the following statement of requirements for part of a ticket issuing system.

"An automated ticket issuing system sells rail tickets. Users select their destination, and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged with its cost. When the user presses the start button, a menu display of potential destinations is activated along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued."

(Marks=5)

Q4)

(CLO-2)

immediate  
use

A design team has two ideas (A & B) for a training interface for novice users of an electronic funds transfer application (millions of dollars will be transferred each day by each user of this program). To resolve the dispute, they propose to run a user study. Unfortunately, because the product is a secret, they are not allowed to bring in any real users. Therefore, they plan to test each version of the interface on two of the designers (first interface A and then interface B) and measure bottom-line, quantitative data. There are flaws with this plan. Find and describe each of the flaws and say how each can be fixed in the proposed study.

(Marks=5)



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CSE-4xxx Software Engineering | Fall 2018

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**Attempt all questions. Marks distribution is equal. Please write short and concise answers.**

**Q1** (CLO 1/ PLO 1, 3)

The management at ABC car rental has approached you to create their online service. Customers must be able search for and reserve a vehicle for a period of time. They should also be able to upgrade their order to include motor vehicle insurance and car seats for small children. Upon payment the customer should also receive an electronic receipt and confirmation of the collection and return locations for the vehicle. Your solution should consider the case where no vehicles are available for the requested period and if the customer cancels the order. What would your approach be in developing the software system? (Marks=10)

**Q2** (CLO2/PLO 1, 11)

You have been assigned for the development of an Online Examination System for your department. You should identify the requirements. The testing mechanisms the development of the model. You should chose the software development model that would achieve best results. All case scenarios should be taken into consideration. What would be the functional requirements and what would be the nonfunctional requirements. (Marks=10)

**Q3** (CLO3 / PLO 2)

What is the difference between Alpha and Beta testing? What are the advantages and disadvantages of each of these approaches to verification and validation? Explain with the help of two examples? (Marks=10)

**Q4** (CLO4/ PLO 9)

What are the four different stages in a Software Project management and how are they interlinked with one another. Which one is the most important? Give two cases supporting your statement. (Marks=10)

**Q5** (CLO4/ PLO 3, 9)

You are a WebApp designer for *FutureLearning Corporation*, a distance learning company. You intend to implement an Internet-based “learning engine” that will enable you to deliver course content to a student. The learning engine provides the basic infrastructure for delivering learning content on any subject (content designers will prepare appropriate content). Develop a prototype interface design for the learning engine. (Marks=10)