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Indian Institute of Information Technology Una [HP]
An Institute of National Importance under MoE
Saloh, Una (HP) – 177 209

Website: www.iiitu.ac.in

School of Computing
CURRICULUM: HITUGCSE20
Cycle Test – 1
28-06-2022

Degree	B. Tech.	**Branch**	CSE
Semester	II		
Subject Code & Name	CSC203-Basics of Programming		
Time: 60 Minutes	**Answer All Questions**		**Maximum: 20 Marks**

Sl. No.	Question	Marks
1.a	Why is C called a portable language?	(1)
1.b	Write an algorithm to find the first and second highest out of n numbers.	(2)
1.c	Draw a flowchart to write a program which shows the functioning of ATM machine with all the options such as balance enquiry, deposit, transfer, and cash withdrawal. Each time a user can select only one option. Once the option is selected, the program should ask for PIN number and if it matches then the program continues to the selected operations otherwise the program generates error "wrong PIN" and exits the operation. Once the user has performed operation the program exits. (Note: show the use of appropriate selective constructs)	(2)
2.a	Differentiate selective and repetitive structures with the help of suitable examples.	(1)
2.b	Write an algorithm for a program which accepts the number of days the student is late to return the book in library and displays the fine. A library charges a fine for every book returned late. For first 5 days the fine is 10 rupees, for 6-10 days fine is 20 rupees and above 10 days fine is 30 rupees. If you return the book after 30 days fine is 100 rupees.	(2)
2.c	Write an algorithm for a program which reads the age of 100 persons and counts the number of persons in the age group 50 to 60. The program skips the counting if the user enters age less than 50 and more than 60 and the program stops when user enter any negative age number.	(2)

3.a	Identify which type of conversion is performed in the program given below. Also illustrate the use of type conversion performed in the given program.
	
	#include <stdio.h>
	int main()
	{
	double a = 2.5;
		(1)

	double b = 2.6;
	double c = 3.9;
	int result = (int)a + (int)b + (int)c;
	printf("result = %d", result);
	return 0;
	}	

3.b	Show the use of postfix and prefix increment operator with the help of the program given below. Also find the output of the program.
	
	#include <stdio.h>
	
	int main()
	
	{
	int a = 1, b = 1, d = 1;
	printf("%d, %d, %d", ++a + ++a+a++, a++ + ++b, ++d + d++ + a++);
	}
		(2)

3.c
i.
	Find the output of following programs.
	#include <stdio.h>
	int main()
	{
	printf("%d", 1 << 2 + 3 << 4);
	return 0;
	}
		(2)

ii.	#include <stdio.h>
	int main()
	
	{
	int a = 1;
	int b = 1;
	int c = a || --b;
	int d = a-- && --b;
	printf("a = %d, b = %d, c = %d, d = %d", a, b, c, d);
	return 0;
	}	

4.a	What are symbolic constants? Briefly explain the need of symbolic constant with the help of example.	(1)
4.b	Write pseudo code which takes string input from the user and counts the number of words, characters, and counts white spaces in the string.	(2)
4.c	Write pseudo code for a program which prints the following pattern: A B C D E F G G F E D C B A A B C D E F F E D C B A A B C D E E D C B A A B C D D C B A A B C C B A A B B A A A	(2)

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AY 2022-23
School of Computing
Curriculum: IIITUGCSE22
Cycle Test – I
07, Jun. '23

Degree	B. Tech.	**Branch**	CSE
Semester	II		
Subject Code & Name	ENC204: Communication Skills		
Time: 60 Minutes	**Answer All Questions**		**Maximum Marks: 20**

S. No.	Question	Marks
1.a	Explain 'encoding' in the process of communication with proper example. (Word limit: 50-70)	(1)
1.b	Define any of the following **two** concepts: (Word limit: 100-120) i) Kinesics ii) Paralinguistics iii) Proxemics	(2)
1.c	Explain the importance of language and how it can become a barrier in the process of communication. (Word Limit: 100-120)	(2)
2.a	What is the difference between Intrapersonal, Interpersonal and Extra-personal Communication. (Word limit: 50-70)	(1)
2.b	Explain the advantages and disadvantages of diagonal communication. (Word Limit: 100-120)	(2)
2.c	Explain the difference between soft skills and hard skills with example. (Word Limit: 100-120)	(2)

3.a	Listening involves hearing and understanding. Explain. (Word limit: 50-70)	(1)
3.b	Punctuality communicates a lot about one's personality and hence chronemics is an important non-verbal trait. Explain. (Word limit: 100-120)	(2)
3.c	Choose the suitable idiom: • I am so happy to hear about your promotion. Life will be _____ now. a. in the first lane b. in the fast plane c. in the fresh lane d. in the fast lane • If she fails in all subjects, I am afraid she will have to _____. a. Go back to the faculty board b. Go back to the study board c. Go back to the drawing board d. Go back to the square board	(2)
4.a	What is the difference between tete-a-tete and parley? (Word limit: 50-70)	(1)
4.b	Write down one word substitutes for the following phrases: 1. An excessively morbid desire to steal 2. A system of government in which only one political party is allowed to function 3. A man who knows a lot about things like food, music and art 4. A group of three powerful people	(2)
4.c	Write down at least two synonyms for the following words: 1. Boorish 2. Pernicious 3. Admonish 4. Servile	(2)

Good Luck

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AY 2022-23

School of Basic Sciences

CURRICULUM: IIITUGCSE22

Cycle Test – I

06, Jun.'23

Degree	B. Tech.	**Branch**	CSE
Semester	II		
Subject Code & Name	EVC205: Basic Environmental Science and Engineering		
Time: 60 Minutes	**Answer All Questions**		**Maximum: 20 Marks**

Sl. No.	Question	Marks
1.a	Define energy conservation with examples.	(1)
1.b	Compare the conventional and non-conventional energy sources with examples.	(2)
1.c	Outline the social impacts of nuclear power plants.	(2)
2.a	What are the important areas of energy savings in Industry?	(1)
2.b	Illustrate the effects of emissions of nitrogen oxides from thermal power plants.	(2)
2.c	Explain briefly the economic impacts of hydro power plants?	(2)
3.a	Explain Energy Conservation Act.	(1)
3.b	Model the block diagram of a thermal power plant.	(2)
3.c	Demonstrate the working of the green hydrogen energy production process with a suitable diagram.	(2)
4.a	How is Betz's constant used for determining the efficiency of wind energy conversion factor?	(1)
4.b	Demonstrate the functioning of a geothermal energy plant.	(2)
4.c	Illustrate the working of a circular digester floating gas type biogas plant.	(2)

****** Good Luck ******

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AY 2021-22
School of Computing
Curriculum: IIITUGCSE20
End Semester Exam
22-08-2022

Degree	B.Tech.
Branch	CSE
Semester	II
Subject code/name	MAC211/ Probability and random process
Time	180 minutes
Maximum Marks	100

Answer all the questions.

Q. No.	Questions	Marks
1(a)	From 6 positive and 8 negative numbers, four numbers are chosen at random without replacement, and multiplied. Illustrate what is the probability that the product is positive?	5
1(b)	Consider three urns A, B, C have the following colored balls: A: 6 red, 4 white, B: 2 red, 6 white, C: 1 red, 8 white. An urn is chosen at random and a ball is drawn. The ball turns out to be red. What is the chance that urn A is chosen?	5
1(c)	If *pdf* of a continuous random variable X is given as: $f(x) = \begin{cases} ax, & 0 \le x \le 1, \\ a, & 1 \le x \le 2, \\ 3a - ax, & 2 \le x \le 3, \\ 0, & \text{elsewhere.} \end{cases}$ (i) Find the value of a. (ii) Find the *cdf* of X.	5
1(d)	If X represents the outcome when a fair dice is rolled. Find the moment generating function of X. Hence calculate $E(X)$ and $\text{Var}(X)$.	5

2(a)	Find the mean and variance of the geometric distribution.	5
2(b)	A coin is tossed until the first head occurs. Assuming the tosses are independent and the probability of a head occurring is p. Find the value of p so that the probability that an odd number of tosses is required, is 0.6 .	5
2(c)	Find the probability density function of the random variable $Y = aX + b$ in terms of the probability density function of the random variable X.	5
2(d)	A certain type of storage battery lasts, on average, 3 years with standard deviation 0.5 years. Assuming that the battery life is normally distributed, find the probability that a given battery will last less than 2.3 years. Use Table 1 given on page 4.	5
3(a)	The joint *pdf* of a two dimensional random variable (X, Y) is given by: $$f(x,y) = xy^2 + \frac{x^2}{8},\ 0 \le x \le 2,\ 0 \le y \le 1.$$ Examine the following: (i) P$(X > 1)$ (ii) P$(Y < 0.5)$ (iii) P$(X > 1/Y < 0.5)$	5
3(b)	If X and Y each follow an exponential distribution with parameter 1 and are independent, construct the *pdf* of $X - Y$.	5
3(c)	Toss three coins. Let X denote the number of heads on the first two and Y denote the number of heads on the last two. Find the joint distribution of X and Y. Also, find the correlation coefficient of X and Y.	5
3(d)	Two fair dice are tossed 600 times. Let X denote the number of times a total of 7 occurs. Use *Central Limit Theorem* to find $P[90 \le X \le 110]$.	5
4(a)	Show that the random process defined by the following: $$X(t) = A\cos(\omega_0 t + \theta)$$ is *wide-sense stationary*, if A and ω_0 are constants and θ is a uniformly distributed random variable in $(0, 2\pi)$.	5
4(b)	Find mean and auto correlation of the *Poisson* process.	5
4(c)	Suppose that customers arrive at a bank according to a *Poisson* process with a mean rate of 3 per minute, find the probability of occurrence of the following events during a time interval of 2 minutes: (i) exactly 4 customers arrive (ii) more than 4 customers arrive.	5
4(d)	The transition probability matrix of a *Markov chain* $\{X_n\}$, $n = 1, 2, 3, \ldots$, having three states 1, 2 and 3 is: $$P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$$ and the initial distribution is $p^{(0)} = (0.7, 0.2, 0.1)$. Find (i) $P\{X_2 = 3\}$ (ii) $P\{X_3 = 2,\ X_2 = 3,\ X_1 = 3,\ X_0 = 2\}$.	5

5(a)	Find the average number of customers in the system for the queueing model $[(M/M/1):(\infty/FIFO)]$.	5
5(b)	Arrivals at an election booth are considered to be *Poisson* with an average time of 10 minutes between one arrival and the next. The length of voting is assumed to be distributed *exponential* with a mean of 3 minutes. (i) Find the average number of voters in the system. (ii) What is the probability that a voter arriving at the booth will have to wait?	5
5(c)	Find the average number of customers in the queue for the queueing model $[(M/M/1):(N/FIFO)]$.	5
5(d)	A beauty parlour has space to accommodate only 10 customers. The beautician can serve only one customer at a time. If a customer comes to the beauty parlour and finds it full, then proceeds to the next shop. Customers randomly arrive at an average rate $\lambda = 10$ per hour. If the beautician's service time is *exponential* with an average of $\frac{1}{\mu} = 5$ minutes per customer, then find P_0 and P_n. Here P_n denotes the probability that there are n customers in the system.	5

$***$ All the best $***$

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AY 2022-23

School of Basic Sciences

CURRICULUM: IIITUGCSE22

Cycle Test – I

05, June' 2023

Degree	B. Tech.	**Branch**	Computer Science and Engineering
Semester	Second		
Subject Code & Name	PHC202: Engineering Physics		
Time: 60 Minutes	**Answer All Questions**		**Maximum: 20 Marks**

Q.1a- Show that the acceleration does not depend upon the frame of reference in the Galilean relativity. **1**

Q.1b- Make use of the Lagrange's equations of motion and find the generalized momentum by making an analogy with the Newton's second law of motion. **2**

Q.1c- Find the Lagrangian and the Hamiltonian of double Atwood machine which consists of one of the pulleys replaced by an Atwood machine. Neglect the masses of pulleys. **2**

Q.2a- Explain why an object with a finite mass can never have the speed of light. **1**

Q.2b- Make use of the Lorentz transformation and show that the square of the separation between two events in the Minkowski space is invariant. **2**

Q.2c- At a distance equal to the radius of the Earth's orbit (1.5×10^{11} m), the Sun's radiation has an intensity of about 1.4×10^3 W/m^2. Find the rate at which the mass of the Sun is decreasing. **2**

Q.3a- How is the wave nature of light unable to account for the observed properties of the photoelectric effect ? **1**

Q.3b- A blackbody has its cavity of cubical shape. Find the number of modes of vibration per unit volume in the wavelength region 4,990 - 5,010 Å. **2**

Q.3c- Ultraviolet light of wavelength 350 nm and intensity 1.00 W/m^2 is directed at a potassium surface. **2**

a) Find the maximum kinetic energy of the photoelectrons.

b) If 0.5 percent of the incident photons produce photoelectrons, how many are emitted per second if the potassium surface (the work function is 2.30 eV) has an area of 1.00 cm^2 ?

Q.4a- What are the key differences between Photoelectric and Compton effects ? **1**

Q.4b- X-rays of wavelength 10.0 pm are scattered from an electron at rest. **2**

a) Find the wavelength of the X-rays scattered through 45°.

b) Find the maximum wavelength present in the scattered X-rays.

Q.4c- If $\psi(x) = \dfrac{N}{x^2 + a^2}$, Make use of normalization condition and find the normalization constant N, and probability current density. **2**

**** GOOD LUCK ****