POSSESSION OF MOBILE PHONES IN EXAM IS UFM PRACTICE.

Name: Himanshu Dixit Enrolment No.: B64178

Jaypee Institute of Information Technology, Noida
End Term, ODD 2021 (Phase II)
B.Tech/Dual(CSE, IT, ECE), Ist SEM

Course Code: 15B11CI111 **Maximum Time: 2 Hours**
Course Name: Software Development Fundamentals – I **Maximum Marks: 35**

After pursuing the above-mentioned course, the students will be able to:
C109.1: Explain various phases of software development life cycle
C109.2: Explain various data types, memory allocation schemes. Precedence of arithmetical and logical operations, and need of array, and structures
C109.3: Draw the flow chart and write the high-level code for different problems
C109.4: Apply and implement functions with or without pointers for different problems
C109.5: Demonstrate and implement various operations like traverse, insertion, deletion, etc. on files.

(Attempts all the questions)

Ques1 [C109.1] [2+2 Marks]: Analyse the following situations and state which Software Development Life Cycle model is suitable for product development with proper justification:

a) An education portal is to be developed for sharing reading materials, video lectures and assignments for the students of the university. This portal enables users to sign in and access the desired content.
b) An online music streaming website is to be developed. The users can sign in, personalize the interface according to their preference. The website also creates trending list of songs as per the ranking given by users.

Ques2 [C109.3] [6 Marks]: Draw a flowchart for a library that computes the fine for books issued, if returned late. The system first validates a user's ID and then computes the fine.

a) First the ID of the user is validated. The ID must contain at-least one special character, digit and character.
b) If the ID gets validated then the user must enter the no. of days for which fine must be calculated. If the user returns on or before time i.e. No. of days=0, the system must generate a message "No dues...Book returned successfully" else the system must compute the fine based on the following rule:

No. of days	Fine
1-10	1 Rupee per day
11-20	2 Rupees per day
20 and more	4 Rupees per day

Ques3[C109.4] [5 Marks]: Model a function void decToBinary(int n) that generates the binary number for the given decimal number. Model another function int checkPrimeNumber(int n) to check whether a given number is prime or not. Write a program using these functions to print the binary equivalent of all the prime numbers up to the decimal number entered by the user.

A decimal to binary conversion can be done as:

Decimal 13
13/2= 6 (Remainder 1)
6/2=3 (Remainder 0)
3/2=1 (Remainder 1)
1/2=0 (Remainder 1)
Write remainders in reverse order: 1101

Decimal 13 = Binary 1101

Ques4[C109.2] [1+1.5+1.5+2 Marks] A point in a two-dimensional space consists of two coordinates. A line is usually defined by two points through which it passes. For a line that passes through two points (x1,y1) and (x2,y2), its slope can be computed as (y2-y1)/(x2-x1).

a) Create a structure for storing the records of lines. Each record is structure Line consisting of two points (A and B). Each point is a structure Point with two coordinates x(float) and y(float).
b) Write a function **float findSlope(struct Line)** to find the slope of the line
c) Write a function **int isparalle(struct Line, struct Line)** to check if two lines are parallel or not.

Write a main function to enter the details of the 5 lines into the system, print the details of the lines and its slope. Also check if line 1 is parallel to line 2.

Ques5[C109.4] [5 Marks]: Write a C program to encrypt and decrypt the given string using the mentioned strategy.

The function **char* Encrypt(char* str, int key)** takes as input the string and a key (any integer between 1 to 5) . For encryption, each character of the given string is picked and key is added to its ASCII value to obtain a character and then this character will be repeated key times. The value of key will be reduced after processing each character of the input string. Once the value of key becomes 1, it will not be further reduced.

The function **char* Decrypt(char* str, int key)** takes as input the encrypted string and a key (any integer between 1 to 5). This function performs the opposite task to get the original string.

For Example:
String: ENDTERM
Key: 3
After Encryption: HHHPPEUFSN
After Decryption: ENDTERM

1st char 3 → 2nd 2
upto 1

Ques6[C109.4] [2 Marks] Identify the output of given program with proper justification.

```
1.  #include<stdio.h>
2.  void mystery(int *ptra, int *ptrb)
3.  {
4.  int *temp;
5.  temp = ptrb;
6.  ptrb = ptra;
7.  ptra = temp;
8.  printf("\n%d,%d",*ptra,*ptrb);
9.  }
```

```
10. int main() {
11. int a=2022, b=2020, c=2021, d=2019;
12. mystery(&a, &b);
13. if (a < c)
14. mystery(&c, &a);
15. mystery(&a, &d);
16. printf("\n In main");
17. printf("\na=%d,b=%d,c=%d,d=%d", a,b,c,d);
18. return 0; }
```

Ques7[C109.5][7 marks] A garment company manufactures shirts, pants and t-shirts. Each garment is allocated a serial number according to the following rule: Serial number is alphanumeric with 6 characters. The first character is S for a shirt, P for pants and T for t-shirt. The next character specifies the production units: K for Kolkata, D for Delhi, C for Chennai. The next two characters are any number between 10 to 20 representing year of production (2010-2020). The last two characters are any random two digit number from 01 to 99. For Example: SD1989. All the serial numbers are stored in a file called as "Production.txt". Each serial number is stored in a new line in the file. Write a program to retrieve the serial numbers of defective pants, shirts and t-shirts and write it back to the files called "DefectivePants.txt", "DefectiveShirts.txt", and "DefectiveTshirts.txt" respectively.

The details of the defective garments are given as: a) All the pants and t-shirts manufactured in Kolkata Unit in the year 2012. b) The t-shirts manufactured in the year 2016 and pants in the year 2014 in Delhi Unit. c) The shirts manufactured in Chennai unit in the year 2011.

---------- All The Best----------

POSSESION OF MOBILES IN EXAM IS UFM PRACTISE.

Name Himanshu Dixit Enrollment No. B64178

Jaypee Institute of Information Technology, Noida

End Term Examination, ODD 2021(Phase II)
B.Tech., Semester I

Course Title: Physics-1 **Maximum Marks: 35**
Course Code: 15B11PH111 **Maximum Time: 2 Hours**

Note: Attempt all questions. Marks and COs are mentioned against each question.

COURSE OUTCOMES		COGNITIVE LEVELS
C101.1	Recall the basic principles of physics related to optics, relativity, quantum mechanics, atomic physics.	Remembering (C1)
C101.2	Illustrate the various physical phenomena with interpretation based on the mathematical expressions involved.	Understanding (C2)
C101.3	Apply the concepts/principles to solve the problems related to wave nature of light, relativity, quantum mechanics and atomic physics.	Applying (C3)
C101.4	Analyze and examine the solution of the problems using physical and mathematical concepts involved.	Analyzing (C4)

Q-1:

(a) Why does the separation between consecutive Newton's ring decrease at higher order? [1]

(b) How many orientations of orbital angular momentum vector 'L' is possible for f orbital? [1]

(c) What do you understand by ultraviolet catastrophe? [1]

(d) How the shape of a square lamina will appear to a stationary observer if the lamina is moving with velocity 0.6c along one of its side? Justify your answer. [2]

(e) Designate the possible states for He atom in excited state $1s^1\ 2p^1$. [2] [CO1]

Q-2:

(a) Write down the expression for intensity in N-slits diffraction pattern. Using this deduce the condition for minima. How many secondary maxima will be obtained in between two consecutive principle maxima? [2.5]

(b) A left circularly polarized beam of $\lambda = 5893\text{Å}$ is incident normally on the calcite crystal of thickness 5.14μm, which is cut parallel to its optic axis. What would be the state of polarization of emergent light? {Given $\mu_o = 1.6584$, $\mu_e = 1.4864$} [2.5]

(c) What do you understand by the phase velocity and group velocity of a matter wave? Establish a relation between phase velocity and group velocity for a dispersive medium. [3]

(d) Polarimeter experiment is being performed by three students. They have taken together 20g of sugar and 10g of another optically active substance dissolved in 100cc of water. If the length of polarimeter tube is 20 cm and rotation observed by them are 6.9°, 7°& 7.1°, respectively. Find the specific rotation of unknown substance. (specific rotation of sugar is + 66.54 deg.cm^3/g.dm) [2.5] [CO2]

Q-3:

(a) Sunlight arrives at the Earth at the rate of about 1.4 kW/m^2, when the Sun is directly overhead. The average radius of the Earth's orbit is 1.5×10^{11}m and the radius of the Sun is 7×10^8 m. Find the surface temperature of the Sun. (assuming that it radiates like a black body) [3.5]

$\sigma = 5.67\times10^{-8}$

(b) What is Zeeman effect? In a normal Zeeman effect experiment, spectral splitting of lines at the wavelength 643.8 nm corresponding to transition $5\ ^1D_2 \longrightarrow 5\ ^1p_1$ of cadmium atom is to be observed. If

the spectrometer has a resolution of 0.01nm. What is the value of minimum magnetic field needed to observe this?

(c) The electrons with energy 1.0 eV are incident on a barrier of energy 10 eV and width 0.5 nm. Find [3.5]

(i) Transmission probability of electrons.

(ii) How the transmission probability is affected if (a) the barrier width is doubled; (b) Energy of incident electrons is doubled.

Q-4: [3.5] [CO3]

(a) An electron is confined into an infinite potential well of length 'L' located between $-L/2 \leq x \leq L/2$. If the wave function of electron in ground state is described by $\psi = A\cos(\pi x/L)$, Find

(i) The value of constant A.

(ii) Probability of finding the electron in the region $0 \leq x \leq L/4$.

(iii) Expectation value of momentum. [3]

(b) Using Uncertainty principle show that the electron cannot exist inside the nucleus. (Given: order of nucleus diameter~10^{-14}m; rest mass energy of electron =511keV) [2]

(c) What is the wavelength of most intense radiation emitted by Human body? Which type of sensor is being used to detect this radiation? [2] [CO4]

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Speed of light = 3×10^8 m/s; Wien's constant =2.9×10^{-3}mK; rest mass of electron =9.1×10^{-31}kg

POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name Himanshu Dixit **Enrollment No.** B64178

Jaypee Institute of Information Technology, Noida
End Term Examination, ODD Semester 2021
B.Tech I Semester

Course Name: English **Maximum Time: 2 Hr.**
Course Code: 15B11HS112 **Maximum Marks: 35**

After pursuing this course, the student will be able to:

C114.1	Develop an understanding and appreciate the basic aspects of English as a communication tool.
C114.2	Apply grammar concepts and vocabulary skills in presentation and in spoken and written communication.
C114.3	Demonstrate an understanding of different forms of literature and rhetorical devices.
C114.4	Examine literature as a reflection of individual and society.
C114.5	Compose different forms of professional writing.
C114.6	Apply Phonetics through theory and practice for better pronunciation.

Note: Attempt all questions.

Q 1 Your institute has adopted a village as a social responsibility. The members of the National Serving Scheme(NSS) of your institute carry out various drives in the adopted village. You as Head of the Student Wing of NSS of your institute have been asked to submit a **memo style report** to the Director, **elaborating the details of drives in the last semester and recommendations for the next semester.** Invent the necessary details. **(CO5,5)**

Q 2 The management of XYZ organization has decided to hold a meeting, first in series, to discuss the introduction of a canteen offering different cuisines; luncheon coupons; maintaining hygiene standards etc. **Draft a notice annexing six agenda items for the meeting to be held and also frame the minutes of the same.** Invent the necessary details. **(CO5,8)**

Q 3 **Read the passage given below and answer the questions that follow:** **(CO5,6)**

Time and again it has been illustrated that the many celebrated figures of the world who ended their days in derangement were uniformly worried about becoming insane. Robert Schumann, the great composer, it is written, voiced his fear of being sent to a 'lunatic asylum' at Bonn. Of Swift, Professor Lombroso writes: 'The inventor of irony and humour, predicted even in youth that he would die insane, as had been the case with the paternal uncle.' When he died 'in a state of complete dementia he left a will of $11,000 to a lunatic asylum.' Schopenhauer, Lincoln, and Nijinsky are quoted as expressing anxiety about their insanity before and during their mental breakdown.

a) Cite the topic sentence.
b) Infer the style used to develop the paragraph.

c) Identify the type of the given paragraph.
d) Assess any three devices of emphasis used by the writer in the paragraph.

Q 4 **Illustrate** any four elements of Addenda in a Letter-Text Combination Form report. **(CO5, 2)**

Q 5 "We are dealing with a sly, crafty individual, who will try to get the better of us- and his money back- by hook or crook. We must checkmate him." This statement from the play 'Refund' was said by Mathematics master. **Examine the strategy** teachers had followed in order to checkmate Wasserkopf. **Support** your answer with relevant instances. **(CO4,4)**

Q 6 . **Interpret and explain** the phrase: Where the clear stream of reason has not lost its way Into the dreary desert sand of dead habit, in the context of contemporary society of India. **Support** your explanation with examples from real life situations, you see around yourself nowadays. **(CO4,4)**

Q 7 **Infer the Literary Devices** in the instances given below: **(CO3,2)**

a) The cave gleamed an invitation, and then winked, mischievously.

b) That woman is the cancer of my dreams and aspirations

Q 8 **Compare and contrast** Chronemics and Kinesics with suitable examples. **(CO2,2)**

Q 9 **Identify the word:** **(CO2,2)**

a) **Nearest in meaning**: Pensive

i) reflective
ii) gloomy
iii) confident
iv) affectionate

b) **Opposite in meaning**: Incredulous

i) argumentative
ii) imaginative
iii) indifferent
iv) believing

POSSESION OF MOBILES IN EXAM IS UFM PRACTICE.

Name Himanshu Dixit Enrollment No. B64178

Jaypee Institute of Information Technology, Noida
End Term Examination, Odd Semester 2021
B.Tech First Semester

Course Title: Mathematics I **Maximum Time: 2 Hours**
Course Code: 15B11MA111 **Maximum Marks: 35**

After pursuing the above mentioned course, the student will be able to		
CO1	Explain the concepts of limits, continuity and differentiability of functions of several variables	C2
CO2	Explain the Taylor's series expansion of functions of several variables and apply it in finding maxima and minima of functions	C3
CO3	Make use of double and triple integrals to find area and volume of curves and surfaces	C3
CO4	Explain the concepts of vector calculus and apply Green's, Stoke's and Gauss divergence theorems in engineering problems	C3
CO5	Solve the ordinary differential equations and explain the concepts of Laplace transform for solving engineering problems	C3
CO6	Utilize matrix algebra for solving a system of linear equations and explain eigenvalues, eigenvectors, diagonalizationand quatrtic form	C3

Note: Attempt all questions in sequence.

1. [CO2].Find the linear Taylor series polynomial approximations to the function $f(x,y) = x^2y + 3y - 2$ about the point (1,-2). Also, obtain the absolute error for the above approximation in the region $|x-1| < 0.1; |y+2| < 0.1$. **[2 M]**

2. [CO6]. For what values of a and b the following system of linear equations has no solution $x + y + z = 2;\ x + 2y + z = -2;\ x + y + (a-5)z = b$. **[2 M]**

3. [CO1]. For $z = 2log\,(x+y) + \frac{x+y}{x^2+y^2} - log\,(x^2+y^2)$, find the value of $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y}$, using Euler's theorem. **[3 M]**

4. [CO2]. Find and classify all the critical points of the following function $f(x,y) = x^3 + y^3 - 3x - 12y + 20$. **[3 M]**

5. [CO3]. Using double integral find the area of the region bounded by the curves $y = x^2$ and $x + y = 2$ in the first quadrant. **[3 M]**

6. [CO4]. Consider $\vec{F} = -18xz\,\hat{i} - 2z^2\,sin\,x\,.cos\,z\,\hat{j} + 10\,z^2\,\hat{k}$ and S is the surface of cylinder bounded by $x^2 + y^2 = 9, z = 4\ and\ z = 5$. Find the value of $\iint_S \vec{F}.\hat{n}\,ds$ using Gauss-Divergence theorem. **[3 M]**

7. [CO4]. Determine whether $\vec{F} = 3x^2y^2\,\hat{i} + (2x^3y + cos\,z)\,\hat{j} - ysin\,z\,\hat{k}$ is a conservative force field? If so, find the scalar potential. Also find the work done in moving a particle from $(0,0,0)\ to\ (1,1,\pi)$. **[3 M]**

8. [CO5]. Evaluate the following integral using Laplace transform $\int_0^\infty te^{-2t}\sin 2t\,dt$. **[3 M]**

9. [CO5]. Solve the following differential equation $x^2y'' + 3xy' - 3y = x^2 + \cos(\ln x)$. **[4 M]**

10. [CO6]. Let $A = \begin{bmatrix} 2 & 4 & 2 \\ 12 & -2 & 0 \\ -2 & -4 & -2 \end{bmatrix}$. Find all the eigen values and linearly independent eigen vectors of A. Is the matrix A diagonalizable? Justify your answer. **[4 M]**

11. [CO5]. Solve the following initial value problem using Laplace transform $y'' + 3y' + 2y = u(t-2);\ y(0) = y'(0) = 0$. **[5 M]**

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POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE

Name..HIMANSHU DIXIT Enrollment No. .....B64178.....

Jaypee Institute of Information Technology, Noida
End Term, Odd 2021
B.Tech. 1st Semester

Course Name: Bridge Course-I **Maximum Marks: 40**
Course Code: 21B19GE111 **Maximum Time: 2Hrs**

After pursuing the above mentioned course, the students will be able to:

CO1: Explain the basics of relations, functions and inverse functions.
CO2: Explain the concepts and applications of matrices, definite integrals and differential equations.
CO3: Demonstrate concepts of vectors, three dimensional geometry and probability.
CO4: Explain the basic concepts of current electricity, magnetism, optics and modern physics.

Note: Attempt all questions. Scientific calculator is allowed.

Part: A (Physics)

Q1. What is displacement current? Consider a parallel plate capacitor which is maintained at potential of 200 V. If the separation between the plates of the capacitor and area of the plates are 1 mm and 20 cm^2. Calculate the displacement current for the time in 1 μs. [CO4,3M]

Q2. Obtain the maximum values of currents flowing through circuit during the charging and discharging of a capacitor respectively. Also discuss the effect of dielectric medium on capacitance of a capacitor. [CO4,3M]

Q3. Define mass defect and explain their role in nuclear energy. [CO4,3M]

Q4. A long straight conductor carries a 1.0 A current. At what distance from the axis of the conductor does the resulting magnetic field have magnitude B = 0.5×10^{-4} Tesla. [CO4,3M]

Q5. A battery has an emf of 12 V and connected to a resistor of 3 ohm. The current in the circuit is 3.93 A. Calculate [CO4,3M]
(a) terminal voltage and the internal resistance of the battery.
(b) power delivered by the battery and power delivered to the resistor.

Q6. (a) Write down the volume element in spherical polar coordinates. (b) What is the difference between electrical susceptibility and magnetic susceptibility? [CO4,3M]
(c) Discuss the limitations of Ohm's law.

Q7. What is the difference between stable and unstable nuclei? Explain the role of nucleons for same. [CO4,2M]

Part: B (Mathematics)

Q1. Write the domain of the real valued function $y = \cos^{-1}(x^2 - 4)$. [CO1, 3M]

Q2. Solve the following system of linear equations by matrix method [CO2, 4M]

$$3x - 2y + 3z = 8;\ \ 2x + y - z = 1;\ \ 4x - 3y + 2z = 4.$$

Q3. Evaluate the following integral as a limit of sum [CO2, 3M]

$$\int_2^4 2^x\, dx.$$

Q4. Solve the following differential equation [CO2, 3M]

$$(x+1)\frac{dy}{dx} - y = e^x(x+1)^3.$$

Q5. The probability that a bulb produced by a factory will fuse after 150 days of use, is 0.05. What is the probability that out of 5 such bulbs, (i) none (ii) not more than one (iii) at least one, will fuse after 150 days of use? [CO3, 4M]

Q6. Find the value of α so that the plane $-2x - 3y + 6z = 11$ makes an angle $\sin^{-1}(\alpha)$ with x- axis. [CO3, 3M]