Name __Ruhi__

Enrollment No. __9421103145__

Jaypee Institute of Information Technology, Noida
Test 1 Examination, Odd Semester 2023
B. Tech, V Semester

Course Name: 20B12CS334

Course Code: Object Oriented Analysis and Design using JAVA

Max Time: 1 hr

Max Marks: 20

CO1	Explain Object oriented analysis and design principles
CO2	Analyze requirements to identify use cases, classes, and objects
CO3	Create UML diagrams for structural and behavioural modelling
CO4	Design and implement software solutions using object oriented analysis and design
CO5	Evaluate software design complexity using metrics

Note: Attempt all the questions.

Q1. Analyze the attributes of organized complexity in the context of a traffic management system for a city. Provide practical solutions or strategies for each attribute to effectively handle the complexity. Explain how these solutions contribute to the system's robustness and scalability.

[CO1 (Understanding), 5 Marks]

Q2. Assume that you need to design a complex software system for an online learning platform. The system should support various courses, user profiles, assessments, and content delivery. Discuss how you would apply the principles of abstraction, encapsulation, modularity, and hierarchy within the object model of this online learning platform.

[CO1 (Understanding), 4 Marks]

Q3. Consider a software system for managing "G20 Meet". The system includes four classes with following details:

Class Name	Attributes	Operations
G20 Meet	Data and Time	Welcome() and Security()
Guest	GuestID, MobileNumber	Visit() and Deny()
Employee	EmpID	addGuest() and removeGuest()
Admin	Name	addEmployee() and removeEmployee()

Design the class diagram with attributes, operations, relationships, and multiplicity specifications for each class. Use clear and organized UML notation.

[CO3 (Applying), 5 Marks]

Q4. What are possible metrics for performing a quality check on identified classes and objects in a system's design? Provide an explanation of each metric and its significance in evaluating the quality of design.

[CO2 (Analyzing), 3 Marks]

Q5. Identity and explain the error/output of following JAVA program.

[CO4 (Applying), 3 Marks]

```java
public class Test
{ public static void main(String args[])
  { int number=3, result =0;
    int i=1;
    while (i<=number){
      if(i%2==0){
        result^=i;
    }
    System.out.println("I:"+i);
    i++;
  }
    String type;
    switch(result){
      case 0: type="zero"; break;
      case 1: type="one"; break;
      case 3: type="three"; break;
      default: type="unknown";
    }
    System.out.println("Result:"+ result);
    System.out.println("Type:"+type);
}}
```

Name __Ruhi__

Enrolment No. __9421103140__

Jaypee Institute of Information Technology, Noida
Test-1 Examination, 2023
B. Tech, V Semester

Course Title : Positive Psychology
Course Code : 16B1NHS432

Maximum Time: 1Hr
Maximum Marks: 20

CO1	Demonstrate an understanding of the various perspectives of positive psychology and apply them in day to day life
CO2	Examine various theories and models of happiness, well-being and mental health
CO3	Recommend possible solutions for enhancing happiness, well-being and mental health
CO4	Evaluate interventions/ strategies for overall positive functioning

Note: Attempt all the questions.

Q1. How the dimensions of psychological well-being as proposed by Carol Ryff may be applied in everyday life?
[CO1 (apply), 5 Marks]

Q2. Distinguish between benevolence and altruism using one day to day example for each.
[CO2 (Analyze), 3 Marks]

Q3. Examine the significance of positive psychology with special reference to historical emphasis in psychology on negatives over positives in human experience.
[CO2 (Analyze), 6 Marks]

Q4. You are feeling distressed because of low grade in a particular subject. Evaluate how positive emotions help in expanding thought-action according to Broaden-and-Build theory of positive emotions.
[CO3 (Evaluate), 6 Marks]

Name _____   Enrollment No. _____

Jaypee Institute of Information Technology, Noida
T1 Examination, Odd Semester 2023
B.Tech. V Semester

Course code:15B11CI313   Max. Marks: 20
Course Name: Computer Organization and Architecture   Max. Time: 1 Hr

COs	COURSE OUTCOMES
CO1	Summarize and Classify the different computer systems based on RISC and CISC Architecture.
CO2	Apply the knowledge of performance metrics to find the performance of systems.
CO3	Examining various types of computers based on Instruction Set Architectures.
CO4	Analyze RISC and CISC based system designs for Hardwired and Microprogrammed Controller.
CO5	Apply the knowledge of pipeline, IO and cache to understand these systems. Further, analyze the performance of such systems.
CO6	Create and analyze an assembly language program of RISC and CISC-based systems.

Note: Attempt all the questions in-order.

1. Match the following: [CO1, Understanding, 3Marks]

1. Multilevel Machine	a. Microprogram
2. Instruction set architecture level	b. Specialize in designing new virtual machines
3. Systems programmers	c. Series of levels/Contemporary Computer System
4. CPU	d. Single Clock Cycle Instruction/ small number of clock cycles
5. RISC	e. Translates the program line by line.
6. Interpreter	f. ALU, Control Unit, Register Sets, Internal Buses

2. Imagine a program with 100 instructions, each of which requires 2 CPU cycles to execute. A student at JIIT undertakes the task of rewriting this code, managing to reduce the total number of instructions. However, this optimization comes at a cost, as the CPU cycles per instruction (CPI) increase by 25%. Surprisingly, despite this increase in CPI, the modified program manages to complete its execution in 20% less time than the original program. Can you determine how many instructions are now present in the modified code? [CO2, Apply Level, 3Marks]

3. For a new system, three upgrades with the following speedups are proposed: Speedup A=30, Speedup B=20, Speedup C=15. Only one enhancement may be applied at a time (but multiple enhancements can be used during the program). If speedup improvements A and B are each used for 25% of the time, what proportion of the time must enhancement C be used to obtain an overall speedup of 10 for the whole program? [CO2, Apply Level, 3Marks]

4. Suppose there is a processor with 20 registers, 6 addressing modes and an instruction set of size 16. Each instruction has 5 distinct fields including addressing modes, OPCODE, one destination register, one source register and a 10-bit immediate value respectively. The main memory is byte addressable and of size 1Kx8-bits. If the program has 300 instructions, can we store this complete program in memory? Justify your answer. If not, then find out the maximum number of instructions that can be stored in the memory. [CO3, Apply, 3Marks]

5. A CPU has only two instructions 1 and 2, which use the following signals in time steps T1–T5:

Instruction 1(I_1)	Instruction 2(I_2)
T1:A_{in},B_{out},C_{in}	T1:C_{in},B_{out},D_{in}
T2:PC_{out},B_{in}	T2:A_{out},B_{in}
T3:Z_{out},A_{in}	T3:Z_{out},A_{in}
T4:PC_{in},B_{out}	T4:B_{in},C_{out}
T5:End	T5:End

Generate the hardwired control for the signal A_{in}, C_{out} and Z_{out}? [CO4, Analyze, 3Marks]

6. Translate the high-level assignment statement, **a = a - b**; for the **JC-62** machine as per its Instruction Set (consisting of 7 machine instructions). Assume that a and b are 12-bit integer variables available in system RAM at locations AAh and ABh respectively.
   a) If this program stores from A0h location in memory, write the Hex Code for the program.
   b) If two instructions **LDB addr** (B← RAM(addr)) and **MAB** (A← B) is added to instruction set, write additional control signals (if required) and micro-operations. [CO4, Analyze, 2+1+2 Marks]

Name ....   Enrollment No. ......B1u6.............

Jaypee Institute of Information Technology, Noida
Test -1 Examination, 2023 B.Tech.,
V Semester

Course Title: LASER TECHNOLOGY AND APPLICATIONS   **Maximum Time: 1Hr**
Course Code:16B1NPH533   **Maximum Marks: 20**

CO1	Defining the properties and principle of lasers
CO2	Understanding of various applications of lasers
CO3	Ability to apply the concepts of standard techniques for the pulsed operation of laser and stability of laser resonator
CO4	Analysis of types of lasers

Note: Attempt all the questions

Q1. (a) The wavelength of emission is 600nm and the lifetime is $1\mu s$. Determine Einstein's A and B coefficients.

(b) The sun rays subtend and angle of about 32 minutes on earth and fall at double slit arrangement with wavelength 500nm by using appropriate filter. What should be the separation between the two slits in order to obtain good contrast fringes on the screen?

(c) An orange line of wavelength 605nm has a coherence length of 20cm. Calculate the monochromaticity of the light.

(d) (i) Is two-level laser system possible? Justify your answer.
(ii) What is the role of the factor $h\nu/kT$ in spontaneous emission and stimulated emission?
[CO1 (Remembering), 8 Marks]

Q2. (a) A laser beam with a diameter of 5mm, a power of 7W falls on a convex lens of diameter 15mm and focal length 10mm. If the wavelength of laser is 600nm, calculate the intensity and the electric field amplitude at the focused spot.

(b) Neglecting scattering and the other cavity losses, estimate the threshold gain coefficient and the cavity lifetime for He-Ne laser having typical parameters: refractive index of cavity ~ 1, length of cavity 20cm and the reflectivity of each mirror = 0.98.

(c) Define the brightness of a diffraction-limited beam. The brightness of probably the brightest lamp so far available (PEK Labs type 107/109, excited by 100 W of electrical power) is about $95 W/cm^2 sr$ in its most intense green line (wavelength = 546nm). Compare this brightness with that of a 1 W Argon ion laser (Wavelength = 514.5nm), which can be assumed to be diffraction-limited.

(d) Write all possible laser rate equations for a three-level laser system, by explaining all symbols used.
[CO3 (Applying), 12 Marks]

Name: _Ruh_____   Enrollment No.: _____

Jaypee Institute of Information Technology, Noida
T1- Examination, Odd Semester -2023
B.Tech Semester: Vth

Course Title: Indian Constitution & Traditional Knowledge	**Maximum Time: 01 Hr**
Course Code : 20B13HS311	**Maximum Marks: 20**

After completing the course student will be able to,

CO1: Demonstrate an understanding about the early Indian traditional political thought and the constitutional design by knowing about the structure of government in place.

CO2: Demonstrate an understanding of the role Indian president, prime minister, governor, other members of the legislature in their mutual interaction and local governance as representatives of common masses.

CO3: Analyse the working of Indian federalism with reference to centre state relations.

CO4: Analyse the impact of contemporary challenges such as caste and gender in the working of Indian democracy.

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Q1. Describe any four writs mentioned in the articles 32 and 226 of the Indian constitution which are an effective method of enforcing the rights of the people and to compel the authorities and fulfil the duties which they are bound to perform under the law.

[CO1, (Understanding), 4Marks]

Q2. Briefly discuss the historical underpinnings of the Indian constitution.

[CO1, (Understanding), 4Marks]

Q3. "It has been held that the fundamental rights and the directive principles are the two wheels of the chariot, as an aid to make social and economic democracy a truism".
In light of the above statement examine how Directive Principles of State Policy (DPSP) differ from the fundamental rights enshrined in Part III of the Indian constitution.

[CO1, (Understanding), 3Marks]

Q4. Prime Minister Narendra Modi has announced that the next 25 years of Indian independence leading up to 100th anniversary would be renamed as 'Kartavya Kaal', focussing on the idea of duty and devotion. The PM reinstated the importance of duties of every citizen, stating "duty is not an option for us, but a resolution".
Do you agree with the above statement in context of fundamental duties as enshrined in the Constitution of India? [CO1, (Understanding), 4Marks]

Q5. Examine the ordinance making power of the Indian president. Do you think that the English monarch and the Indian president represent the rubber stamp position in the parliamentary system of governance? [CO2, (Understanding), 5Marks]