

**Jaypee Institute of Information Technology, Noida**  
**End Term Examination, ODD 2023**  
**B.Tech. V Semester**

**Course Title: Indian Constitution & Traditional Knowledge**  
**Course Code: 20B13HS311**

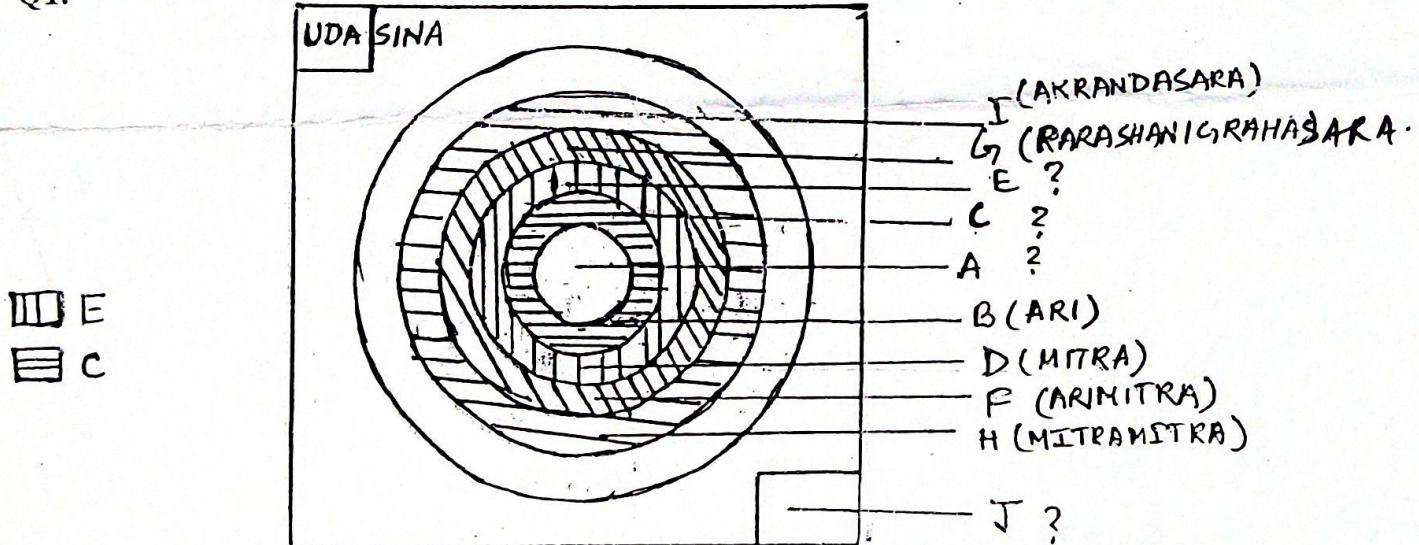
**Maximum Time: 2 hrs**  
**Maximum Marks: 35**

**After completion of the course, students shall be able to:**

CO1	Demonstrate an understanding about the early Indian tradition political thought and the current Indian political scenario by knowing about the structure of the government in place.
CO2	Demonstrate an understanding of the role of India President, Prime Minister, Governor, and other members of the legislature and local governments as representatives of the common masses.
CO3	Analyse the working of Indian federalism with reference to centre-state relations.
CO4	Analyze the impact of contemporary challenges such as caste and gender to the working of Indian democracy.

**Note:** Attempt all questions.

**Q1.**



*"Your neighbour is your natural enemy and neighbour's neighbour is your friend".* Given statement is the central concept of foreign policy and security in Kautilya's Mandala Theory. It posits that a state's security is determined by its position in the network of states. The concentric circles in the diagram above present the visualisation of Kautilya's Mandala Theory. Identify the missing labels (A, C, E and J) in the diagram and briefly define them. [CO1, Understanding, 2 Marks]

Q2. Summarise the salient features of the Indian Independence Act of 1947. [CO1, Understanding, 5 Marks]

Q3. Comment on the relevance of the emergency provisions as enshrined in the Indian constitution (Art 352, Art 356 and Art. 360) [CO2, Understanding, 5 Marks]

Q4. Explain the importance of Protection of Life and Personal Liberty as enshrined in Article 21 of the Indian constitution. [CO2, Understanding, 2 Marks]

Q5. Critically examine the centre-state administrative relations (Art 256- Art 263) in Part XI of the Constitution of India. [CO3, Analyse, 5 Marks]

Q6. Illustrate the provisions of the 5<sup>th</sup> Schedule of the Indian Constitution. Do you think that these provisions have been successful in integrating the tribal people with the rest of the Indian population? [CO3, Analyse, 3 Marks]

Q7. Examine the origin and evolution of the local self-governance in the Indian constitution.  
[ CO3, Analyse, 5 Marks]

Q8. "The state can be compared to a living organism where individuals are regarded as its organs". Critically analyse this statement in the context of Kautilya's Saptang Theory. [ CO3, Analyse, 4 Marks]

Q9. "Gender justice is indispensable for development, poverty reduction, and is crucial to achieving human progress". Explain how the discourse of achieving gender justice has been mainstreamed in the working of the Indian constitution. [CO4, Analyse, 4 Marks]

CO1	Explain the fundamental concepts of computer network and security.	Understand
CO2	Interpret data link layer protocols for multiple access communication, error detection and correction problems.	Understand
CO3	Identify the application of number theory in the cryptographic algorithms.	Apply
CO4	Identify suitable transport layer protocols along with its security solutions.	Apply
CO5	Examine Internet Protocol (IP), routing principles, and IPSec architecture.	Analyze

- Q1. a.** Why Entity authentication is required and what are the methods to authenticate the entity.  
**(CO3 (Apply), 2M)**
- b.** Write the steps of Diffie-Hellman key exchange protocol. If  $g=5$ ,  $p=23$ ,  $x=3$ ,  $y=7$ , then what is the value of symmetric key.  
**(CO3 (Apply), 3+2M)**
- Q2. a.** What three properties a hash function must have? How to apply MD5 hashing algorithm, explain with the help of block diagram.  
**(CO3 (Apply), 1+3M)**
- b.** Explain the process of generating and verifying the digital signature, use figures for explanation.  
**(CO3 (Apply), 4M)**
- c.** Show the process of one round of Data Encryption Standard (DES) algorithm. **(CO3 (Apply), 2M)**
- Q3. a.** What is the significance of waiting time in CSMA/CA. Create complete flow chart of CSMA/CA.  
**(CO2 (Understand), 3M)**
- b.** Show the frame structure and fields of Ethernet (802.3 MAC).  
**(CO2 (Understand), 2M)**
- Q4. a.** Calculate the HLEN (IPv4) value if the total length is 1200 byte, 1176 of which is data from upper layer.  
**(CO5 (Analyze), 1M)**
- b.** In IPv4 packet, the value of HLEN is 1000 in binary. How many bytes of options are being carried by this packet.  
**(CO5 (Analyze), 1M)**
- c.** An organisation granted the block 211.17.180.0/24. The admin wants to create 32 subnets. (i) find number of addresses in each subnet. (ii) find first and last address in subnet 1. (iii) find first and last address in subnet 32.  
**(CO5 (Analyze), 3M)**
- Q5. a.** What is throughput, latency in a network. What components latency has? **(CO1 (Understand), 2M)**
- b.** What are the main functions of SMTP, POP3, and IMAP in Electronic mail system.  
**(CO1 (Understand), 3M)**
- Q6.** Calculate checksum at sender side for the given data (8, 11, 12, 0, 5), also show steps to verify the checksum at receiver side. Use 4 bits for checksum.  
**(CO4 (Apply), 3M)**

**Course Title: Financial Management**  
**Course Code: 16B1NHS433**

**Maximum Time: 2 hr.**  
**Maximum Marks: 35**

**Course Outcomes:** After studying this course the students will be able to-

CO1: Understand the fundamental concepts of financial management and its various dimensions

CO2: Apply the knowledge of the time value of money, capital budgeting techniques and cost of capital in taking long term investment decisions

CO3: Analyze the leverage capacity of a business and apply it in selection of long-term sources of finance

CO4: Evaluate the financial performance of a business through financial statements

**Note:** Answer all questions in the given order.

**Q.1** Why is a preference share called a hybrid security? Do you agree that it combines the worst features of ordinary shares and bonds? **(3 marks)** [CO3, Analyze level]

**Q.2** Define working capital. State the advantages of adequate working capital in an organization. **(3 marks)** [CO1, Understand level]

**Q.3** Ms Kusum has retired recently. She received Rs 28 lacs as her retirement benefit. Out of Rs 28 lacs, she has invested Rs 15 lacs in PNB senior citizen saving account earning @ 8.2% p.a. and Rs 13 lacs in SBI saving account @ 3% interest compounded monthly.

If she expects to live independently for another 15 years, how much money she can withdraw at the end of every year so as to leave a nil balance in both the accounts at the end of 15 years?

**(4 marks)** [CO2, Apply level]

**Q.4** In order to finance an expansion plan, Tulsi Ltd. provides you the following information:

- a) Amount to be raised Rs 40 lacs in a debt-equity ratio of 3:2.
- b) Debt will carry an interest rate of 12% for the first Rs 8 lakhs and 12.5% for the balance.
- c) Present equity share capital is Rs 4 lacs divided into shares of Rs 10 each. Earning per share for the current year is Rs 20. Dividend pay-out ratio is 60%. Dividends are expected to grow at 5% per year. Current market price per share is Rs 90.
- d) Flotation cost of new equity is Rs 6 per share.
- e) Corporate tax rate is 30%.

You are required to calculate the following-

1) Cost of debt, equity and retained earnings.

2) Weighted average cost of capital of the expansion plan.

**(8 marks)** [CO2, Apply level]

**Q.5** Beryl's Iced Tea currently rents a bottling machine for Rs 70,000 per year, including all maintenance expenses. Now instead of renting it is considering to purchase its own new bottling machine. The new machine will cost Rs 250,000. Also, at the time of purchase, Rs 25,000 will be spent in training the operators of the machine. This machine will require Rs 13,000 per year in maintenance expenses and will lower bottling cost by Rs 20,000 per year. The machine will be depreciated using straight line method for the life of 5 years. Salvage value of the machine is negligible. Corporate tax rate is 35% and the appropriate discount rate is 8%.

Using Net Present Value method, suggest if they should continue to rent or purchase the new machine.

**(5 marks)** [CO2, Apply level]

- Q.6 Satyam Ltd. Produces electronic components with a selling price per unit of Rs 100. Fixed costs of Rs 2,00,000. 5,000 units are produced and sold annually. Annual earnings before interest and taxes (EBIT) amount to Rs 97,500. The company's all equity finance assets are Rs 5,00,000. Face value per share is Rs 20.

Now the management has decided to increase its earning per share (EPS) by expanding its production process, adding Rs 4,00,000 to investment and Rs 50,000 to fixed operational costs. As a consequence of this expansion, the variable cost per unit will reduce by Rs 10; the output will increase by 2,000 units and the selling price per unit will reduce to Rs 95.

The funds for the new investment will be raised 50% from Debt and 50% from Equity. The new equity shares will be issued at Rs 20 per share. The cost of debt is 10% and the tax rate is 30%.

(8 marks) [CO3, Analyze level]

- 1) Calculate the new EBIT after the expansion.
- 2) Calculate the EPS before and after the expansion.
- 3) What minimum EBIT must be earned if the management desires to maintain its EPS at Rs 4.5 per share after the expansion?
- 4) Would it be possible to maintain the EPS of at least Rs 4.5 after expansion by changing the mix of debt and equity without changing the EBIT? If yes, what should be the new capital structure?

- Q.7 Following are the ratios of the trading activities of Novartis Pvt. Ltd.

Debtors turnover-	3 times
Stock turnover-	8 times
Creditors turnover-	2 times
Gross profit ratio-	25%

Gross profit for the year ended 31<sup>st</sup> March 2023 amounted to Rs 4,00,000. Closing stock of the year is Rs 10,000 more than the opening stock. Find out the following: (4 marks) [CO4, Evaluate level]

- i) Opening stock and closing stock
- ii) Purchases
- iii) Debtors
- iv) Creditors

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

**Note:** Attempt all the questions

**Q.1:** (a) Why gas lasers emit light, which is more unidirectional and monochromatic as compared to that of solid-state lasers? Write the chemical formula of YAG and Sapphire.

(b) Write the full name of LASIK, LIGO, LAGEOS and LIDAR.

**[CO2 (Understanding), 3+2 Marks]**

**Q.2:** Draw the energy level diagram of CO<sub>2</sub> laser by showing its two prominent wavelengths. Write which mode of energy is represented by (0 0 1). Also, write the roles of N<sub>2</sub> and He gases in this laser.

**[CO2 (Understanding), 5 Marks]**

**Q.3:** Mention the name of active material of dye laser. Draw the energy level diagram of dye laser and show the emission wavelength(s).

**[CO2 (Understanding), 5 Marks]**

**Q.4:** (a) Write the formula of bandgap of Al<sub>x</sub>Ga<sub>1-x</sub>As. Determine the bandgaps and emission wavelengths for AlAs and GaAs laser diodes.

(b) The two energy levels are separated by a certain energy difference, such that the corresponding transition wavelength falls in the middle of the visible range. Calculate the ratio of the populations of the excited level to ground level in thermal equilibrium at room temperature.

**[CO3 (Applying), 3+2 Marks]**

**Q.5:** (a) Show the neat and clean ray diagram of bar code scanner.

(b) Write the two important differences between Q-switching and mode locking of a laser.

**[CO4 (Analyzing), 3+2 Marks]**

**Q.6:** (a) Write the emission wavelengths of argon ion and krypton ion lasers and justify, why lasers based on the mixture of these ion gases are used for multicolor displays?

(b) Write the role of de-Broglie wavelength in quantum well lasers.

**[CO4 (Analyzing), 3+2 Marks]**

**Q.7:** Write the condition of converging and diverging beam in a resonator. Consider a resonator made of two mirrors ( $R_1 > 0, R_2 > 0$ ), separated by a distance L. Find all possible values of L for which the resonator is stable.

**[CO4 (Analyzing), 5 Marks]**

***POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE.***

Name Kaarya

**Enrollment No.** 2404026

**Jaypee Institute of Information Technology, Noida  
End Term Examination, ODD Sem 2023**

B. Tech. V Semester

COURSE OUTCOME		CONGNITIVE LEVEL
C311.1	Explain the fundamental concepts along with the various components of operating systems and systems programming.	Remember Level
C311.2	Apply various OS scheduling techniques and algorithms for process and threads.	Apply Level
C311.3	Elaborate the various resource management techniques of OS and their performance.	Evaluate Level
C311.4	Omit the concept of IPC and describe various process synchronization techniques in OS	Understand Level
C311.5	Compare various disk scheduling algorithms and utilize IO management techniques.	Apply Level
C311.6	Analyze the appropriate OS design when building real world systems.	Analyze Level

**Note: Attempt All the questions.**

**Q1. [CO1, Remember Level, 5 Marks]** Describe the following in context of operating system

- a. How the multiprogramming systems are different from real-time systems?
  - b. Identify the evaluation matrices for process scheduling in a multiprogramming system environment.
  - c. What factors are considered when deciding which process need to execute next?

→ Q2.[CO6, Analyze Level, 5 Marks] In operating system, the source code passes through following system tools before entering execution phase in memory pre-processor, compiler, assembler, linker, and loader. Suppose if linker is not present on system. Is it possible to the code enters execution phase in memory? Justify your statement with proper logic and explanation.

**Q3.[CO3, Evaluate Level, 5 Marks]** Analyze the given code for two processes and answer to the following questions:

- a. What is the output of the below code if both processes are executing concurrently?
  - b. What are three conditions of synchronization; mutual ~~execution~~, no progress, bounded waiting in below code?  
~~exclusion~~.
  - c. If not, what change is needed so that all three conditions are fulfilled?

**Pseudo code:**

Shared variable

int turn

int flag[2]={0,0}

Process P <sub>0</sub> flag[0]=1 turn=1 while(flag[1]==1&&turn==0) printf("I am Process P <sub>0</sub> "); flag[0]=0	Process P <sub>1</sub> flag[1]=1 turn=0 while(flag[0]==1&&turn==0) printf("I am Process P <sub>1</sub> "); flag[1]=0
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**Q4.[CO3, Evaluate Level, 5 Marks]** A system has five process P<sub>1</sub> to P<sub>5</sub> and four resource types R<sub>1</sub> to R<sub>4</sub>.

R4. There are 2 units of each resource types. Given that:

P<sub>1</sub> holds 1 unit of R<sub>1</sub> and requests 1 unit of R<sub>4</sub>P<sub>2</sub> holds 1 unit of R<sub>3</sub> and requests 1 unit of R<sub>2</sub>P<sub>3</sub> holds 1 unit of R<sub>2</sub> and requests 1 unit of R<sub>3</sub>P<sub>4</sub> holds 1 unit of R<sub>4</sub> and requests 1 unit of R<sub>4</sub>P<sub>5</sub> holds 1 unit of R<sub>3</sub> and 1 unit of R<sub>2</sub> and requests 1 unit of R<sub>3</sub>

a. Show the Resource Allocation Graph for this state of system

b. Is the system in deadlock? If so, which process and resources are involved?

**Q5.[CO5, Apply Level, 5 Marks]** Consider a disk with 2000 tracks numbered from 0 to 1999. The current disk arm is at track 800. And the disk scheduling queue is as follows: 1500, 300, 1800, 500, 1900, 100, 1600, 1200, 900, 1400, 1100, 400, 1700, 600, 1300, 700, 300, 1800. The arm moves towards the outermost track. Apply the SSTF, SCAN, C-LOOK to calculate the total number of track movements (seek operations) required to serve all the requests.**Q6.[CO5. Apply Level, 5 Marks]** A UNIX style i-node has 15 direct pointers and one single, one double, and one triple indirect pointer. Disk block size is 16Kbytes, disk block address is of 64 bits. What is the total size of the file system and maximum possible file size?**Q7.[CO4. Understand Level, 5 Marks]** Consider a system where segmentation is used. However, segment and segment table size, both are greater than PAS available. Therefore, paging is applied over segment and segment table both. Following is the description of the system:

The segment is divided into 4K pages each of size 1K words. The segment table is divided into 128K pages, each of size 256 words. The page table entry size is 64 bits. The frame number requires 18 bits to represent the frames of PAS. You need to find the following:

- a. Size of physical address  
c. Page table size of segment

- b. Size of logical address  
d. Page table size of segment table

# **POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE.**

Name Kaavya

Enrollment No. 21104026

## **Jaypee Institute of Information Technology, Noida End Term Examination, ODD Sem 2023-24 B. Tech V Semester**

**Course Title: Fundamentals of Computer Security  
Course Code: 20B12CS332**

**Maximum Time: 2 hrs  
Maximum Marks: 35**

**After Completion this course, students will be able to**

CO1	Explain the fundamental concepts of computer security, malicious code and its effects	Understand(C2)
CO2	Describe various authentication and access control paradigms	Understand(C2)
CO3	Apply various prevention measures and techniques used to obtain secure system	Apply (C3)
CO4	Examine various security parameters from the perspective of legal and ethical issues	Analyse (C4)

**Important Instruction: Attempt all questions.**

### **Q1. Analyze the given scenario and identify the attacks:**

- Suppose a hacker create a fake website that looks indistinguishable from the real one. Then, he launches an email campaign, trying to trick the users to go to the fake website and enter their credentials. Once the hacker has the user credential, he can log into the target network.
- An attacker turns off remote process control equipment and then damage the firmware, or more subtly, update network routes in network infrastructure, to prevent administrators from being able to access equipment.
- A scammer assumes a generic-sounding identify, like Joan Smith, and emails one or several employees from the email address joan.smith@xyzwidgets.com. Joan smith doesn't work for XYZ Widgets, a large multinational company, but the recipient works there.
- Suppose the attacker pose as a trusted individual and trick the legitimate user to open a text, email etc. for stealing the credentials.

[CO4(Analyse), 4 marks]

### **Q2. During a security review of an application code, the following C function is found:**

```
int table[800];
int insert_in_table(int val, int pos){
    if(pos>sizeof(table) / sizeof(int)) return -1;
    table[pos] = val;
    return 0;
}
```

- Is the code, safe? If not, what effect it can bring on the application during execution?
- What changes, if required, should be made to avoid any vulnerability in code?

[CO1(Understand), 4 marks]

**Q3.** Classify each of the following according to various Access Control Policies. Also give suitable justification for your answers.

- a) The file access control mechanisms in UNIX.
- b) A system in which no message can be distributed without the author's consent.
- c) A military facility in which only generals can enter officer's mess.
- d) Registrar's office, in which a faculty member can see the grades of a particular student only if the student has given written permission.

[CO2(Understand),  $1.5 \times 4 = 6$  marks]

**Q4.** Does using passwords with salts make attacking a specific account more difficult than using passwords without salts? Explain why or why not. Why do salts be chosen at random?

[CO2(Understand), 4 marks]

**Q5.** A security analyst wishes to deploy intrusion detection monitors to determine if any attackers penetrate the network. Where should the intrusion detection monitors be placed in the network's topology, and why? If the analyst wished to monitor insider attacks, is there a need to change the placement of the monitors? If, yes, where?

[CO3(Apply), 5 marks]

**Q6.** Suppose that, over time, Bob has accessed the five files F0, F1, F2, F3 and F4 at the rates H0, H1, H2, H3, and H4 respectively.

H0	H1	H2	H3	H4
.20	.30	.40	.40	.60

Bob's recent file access rates are depicted as follows-

A0	A1	A2	A3	A4
.10	.30	.20	.30	.30

- a) Do the accesses by Bob, show normal behaviour?
- b) If over the next time interval, Bob's measured access rates are as given below, find updated access rates and comment on the behaviour of bob's access.

A0	A1	A2	A3	A4
.20	.30	.30	.20	.40

[CO3(Apply),  $3 \times 2 = 6$  marks]

**Q7.** Answer the following in brief:

- a) Analyse the difference between packet filters and application layer proxies.
- b) What are the key characteristics of a reference monitor?
- c) Examine the role of the Information technology Act, 2000 in addressing cyber- crimes.

[CO4(Analyse),  $2 \times 3 = 6$  marks]