



**ARKAJAIN**  
**University**  
Jharkhand

**3<sup>rd</sup> Semester Examination –2021-22**

Subject : Data Analytics using Python  
Course : MCA  
Full Marks : 70

Roll No: .....

Time : 3 Hours.

**Instructions to the Candidates:**

- Read the question paper very carefully.
- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into Three Parts –A, B & C.
- Part-A is containing 12 short question answers.
- Part- B containing SIX questions out of which FOUR questions are to be answered.
- Part C containing FOUR questions out of which TWO questions are to be answered.
- Do not write anything except your Roll No. on the question paper.
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**PART A**

**VERY SHORT QUESTIONS**

**(12x1=12)**

1. How to reverse a list?
2. How does string multiplication work?
3. How can you concatenate lists in python?
4. How to remove duplicate elements from a list?
5. How to check if a value exists in a list?
6. How can you remove all whitespace from a string?
7. What is the difference between “is” and “==”?
8. What is a decorator?
9. What is the difference between “func” and “func()”?
10. List two key features of Panda.
11. What are the benefits of Pandas?
12. Check if a string only contains numbers and letters.

**PART B**

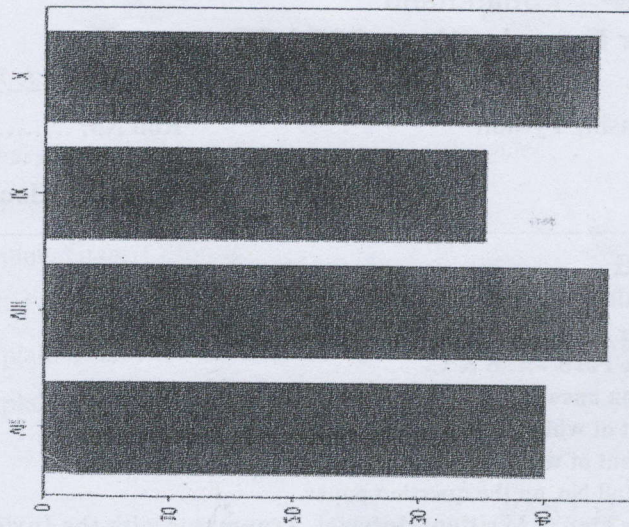
**ANSWER ANY FOUR OUT OF SIX**

**(4x7=28)**

1. Differentiate between append and extend with suitable example. How do any() and all() work?
2. How to combine two lists into a list of tuples? How can you sort a dictionary by key, alphabetically?
3. Differentiate between pass, continue and break with suitable example.
4. Differentiate between remove, Del and pop with suitable example.



5. Differentiate between List and tuple with suitable example. Write code to draw the following bar graph representing the number of students in each class



6. What is the difference between dictionaries and JSON? Explain with suitable example

### PART C

#### ANSWER ANY TWO OUT OF FOUR

(2x15=30)

1. i) What is the difference between a module and a package?  
 ii) Assume a data frame that contains data about IT Quiz Contest with 'SC1', 'SC2', 'SC3', 'SC4', 'SC5' as indexes shown below.

Write the command(s) to display the output of the following questions:

	School	Total_Students	Winner	Runner-up
SC1	APS	40	32	8
SC2	KPS	30	18	12
SC3	KKPS	20	18	2
SC4	MMPS	18	10	8
SC5	TPS	28	20	8

- (i) `>>>df.shape` (1)  
 (ii) `>>>df[2:4]` (1)  
 (iii) `>>>df.loc['SC2':'SC4','Winner']` (1)  
 (iv) `>>>df.iloc[2:4]` (1)  
 (v) `>>>df.Total_Students` (1)
2. i) What is Data visualization?  
 ii) Write Python code to create the following Data Frame books using Python Pandas. Use any method of Data Frame creation that you have learnt



BookName	Class	Price
Let us C	BCA	270
Artificial Intelligence	B.Tech	350
Database Management	BCA	450
Computer Architecture	BCA	550

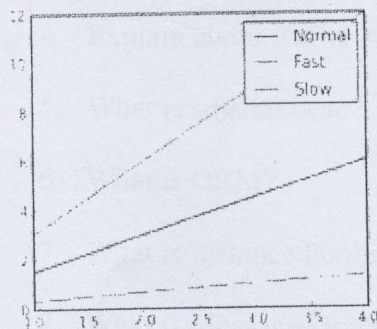
Give index as 'B1', 'B2', 'B3', 'B4'

3. Write the code in Pandas to create the following Data Frames

	Df1			Df2	
	Mark1	Mark2		Mark1	Mark2
0	10	20	0	10	15
1	40	45	1	20	25
2	15	30	2	25	30
3	40	70	3	50	30

Write the commands to do the following operations on the DataFrames given below:

- (i) To add DataFrames Df1 and Df2
  - (ii) To subtract Df2 from Df1
  - (iii) To Rename column Mark1 as Marks1 in both the DataFrame Df1 and Df2
  - (iv) To Change index label of Df1 from 0 to zero and from 1 to one
4. i) Explain Visualization in Time series Data.  
 ii) Write a code to plot the speed of a passenger train as shown in the figure given below:







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**3<sup>rd</sup> Semester Examination -2021-22**

Subject : Advanced Java  
Course : MCA  
Full Mark : 70

Roll No: .....

Time: 3 Hours.

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**PART A**

**VERY SHORT QUESTIONS**

**(12x1=12)**

1. What is Servlet?
2. What is Declaration Tag?
3. What is the instance of Request object?
4. Explain about Buffer Attribute
5. What is session bean?
6. What is ORM?
7. What is Instance Pooling n caching?
8. What is Message Driven Bean?
9. What is destroy ()?
10. What is Customizer?
11. Write down two basic JDBC Data types.
12. What are JSP Page Directives?



## PART B

**ANSWER ANY FOUR OUT OF SIX**

**(4x7=28)**

1. What is JSP? Briefly describe the benefits of JSP?
2. What are the different types of session bean? Explain each of them with its working.
3. Explain about Java Beans. Write down the advantages of Java Beans
4. Write down the annotations of Message Driven Bean with its working.
5. Explain about Info Attribute, error Page, isError Page Attributes, is Thread Safe Attribute
6. What are the different methods of Servlet. Explain

## PART C

**ANSWER ANY TWO OUT OF FOUR**

**(2x15=30)**

1. Explain about EJB with its architecture and components. Also explain the functionalities of different components of EJB.
2. What is Servlet? Explain about the different packages of Servlet with its classes and interfaces.
3. Explain about the Persistence Entity Manager and Entity Relationships in EJB.
4. Write short notes on:
  - a. Message Driven Bean
  - b. Entity Bean
  - c. Life Cycle Callbacks
  - d. Java Persistence API
  - e. Object Relational Mapping





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**3<sup>rd</sup>Semester Examination –2021-22**

**Subject : Internet of Things**  
**Course : MCA**  
**Full Marks : 70**

**Roll No : .....**  
**Time : 3 Hours.**

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**PART A**

**MULTIPLE CHOICE QUESTIONS**

**(12x1=12)**

- 1) **What is the full form of the MQTT?**  
a. Multi-Queue Telemetry Things  
b. Multiple Queue Telemetry Things  
c. Message Queue Telemetry Things  
d. Message Queue Telemetry Transport
- 2) **What is the full form of ICT?**  
a. Interconnect Technology  
b. Internet Connection Topology  
c. Information and Communication Technology  
d. Infer Communication Topology
- 3) **Which of the following frequencies is correct for the Galileo gen 2 board?**  
a. 250 MHz                      b. 400 MHz                      c. 450 MHz                      d. 300 MHz
- 4) **What is the full form of IANA?**  
a. Inter-Assessment-Number-Access  
b. Internet-Association-Numbers-Authority  
c. International-Aid-for-Network-Authority  
d. Internet-Assigned-Numbers-Authority
- 5) **What is the standard port number of secure MQTT?**  
a.1883                      b.8000                      c. 8883                      d. 8888
- 6) **Which of the following layers provides end-to-end communication in IoT?**  
a. Logical layer                      b. Data link layer                      c. Transport layer                      d. Session layer



- 7) Which of the following devices is used to measure the gases or liquid?
- Optical Sensor
  - Gas Sensor
  - Smoke Sensor
  - Pressure sensor
- 8) Which characteristics involve the facility the thing to respond in an intelligent way to a particular situation?
- Intelligence
  - Connectivity
  - Dynamic Nature
  - Enormous Scale
- 9) \_\_\_\_\_ empowers IoT by bringing together everyday objects.
- Intelligence
  - Connectivity
  - Dynamic Nature
  - Enormous Scale
- 10) The collection of data is achieved with \_\_\_\_\_ changes.
- Intelligence
  - Connectivity
  - Dynamic Nature
  - Enormous Scale
- 11) The number of devices that need to be managed and that communicate with each other will be much larger.
- Intelligence
  - Connectivity
  - Dynamic Nature
  - Enormous Scale
- 12) \_\_\_\_\_ in IoT as one of the key characteristics, devices have different hardware platforms and networks.
- Sensors
  - Heterogeneity
  - Security
  - Connectivity

### **PART B**

#### **ANSWER ANY FOUR OUT OF SIX**

(4x7=28)

- Justify there as on sforcingM2M and IoT.
- Demonstrate the IOT Components with neat diagram.
- How RFID middle ware is in corporate din industry?
- What are Subscribers and Publishers in MQTT?
- Give the deployments scenarios for home alarms.
- Summarize the IoT physical Devices in detail.

### **PART C**

#### **ANSWER ANY TWO OUT OF FOUR**

(2x15=30)

- What are the available wireless communications boards present in Raspberry Pi?
- Explain the several factors that need to be considered while choosing your plat form.
- Explain Arduino.What are the things need to be considered for developing on the Arduino?
- Write Case study on following:
  - The Good Night Lamp
  - Energy Sector
  - Agriculture Sector





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**3<sup>rd</sup> Semester Examination -2021-22**

Subject : Design and Analysis of Algorithm  
Course : MCA  
Full Marks : 70

Roll No :  
Time : 3 Hours.

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**PART A**

**VERY SHORT QUESTIONS**

**(12x1=12)**

1. What is time complexity of branch-bound.
2. What is the objective of Travelling sales man problem.
3. What is the objective of Kruskal's algorithm.
4. What is the objective of Prim's algorithm
5. Kruskal's algorithm is used to construct which kind of data structure.
6. What is the objective of Knapsack problem.
7. What is growth of an algorithm.
8. What is the complexity of Huffman coding.
9. What is optimal merge pattern.
10. What are the minimum colours required to colour a bipartite graph.
11. What is the chromatic number of complete graph.
12. What is the chromatic number of a cycle graph



**PART B**

**ANSWER ANY FOUR OUT OF SIX**

(4x7=28)

1. What is backtracking? Explain Hamiltonian cycle
2. Explain travelling sales man problem.
3. Explain Graph Coloring
4. What are the Huffman trees. Explain
5. Explain Characteristics of good algorithm. List out the problems solved by the algorithm
6. Explain Asymptotic Notations properly

**PART C**

**ANSWER ANY TWO OUT OF FOUR**

(2x15=30)

1. Explain the differentiation of Kruskal and Prim's algorithm with proper examples.
2. Explain Dijkstras algorithm.
3. Explain in detail backtracking strategy and give control abstraction for the same.
4. Explain relationship between P, NP, NPcomplete and NPHard