Oct-2023 PG Examinations

USN | 1 | RV | 22 | SCS | 12 |

22IM21T

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU, Belagavi)

II Semester (Common to all M.Tech Programs)

RESEARCH METHODOLOGY

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

1. Each unit consists of two questions of 20 marks each.
2. Answer FIVE full questions selecting one from each unit.
3. Use of statistical tables permitted.

UNIT-1

1	a	Identify and briefly explain the characteristics of a good hypothesis.	08
	b	With the aid of an example, explain the different approaches to problem solving.	12
		OR	
2	a	How can a research problem be classified in general? Discuss.	04
	b	Summarize various group problem solving techniques for idea generation.	08
	c	Distinguish between Quantitative and Qualitative research methods?	08

UNIT-2

3	a	Analyze the 2^3 design:	

	A_1		A_2	
	C_1	C_2	C_1	C_2
B_1	100	15	120	10
B_2	40	30	20	50

i) Quantify main effects and all interactions.
ii) Quantify percentages of variation explained.
Sort the variables in the order of decreasing importance. 12

	b	Bring out the design and study phenomenon in Quasi-Experimental designs with examples.	08
		OR	
4	a	With the help of a flow chart, discuss how is the choice of experimental design for a given situation facilitated.	12
	b	Describe the conditions and situations in which a Latin-Square design is used.	08

UNIT-3

5	a	Identify the types of sampling designs. List and briefly explain various probability sampling methods.	05
	b	A population is divided into three strata so that $N1 = 5000, N2 = 2000$ and $N3 = 3000$. Respective standard deviations are: σ_1=15,σ_2=18 and σ_3=5. How should a sample of size $n = 84$ be allocated to three strata, if we want optimum allocation using disproportionate sampling design?	05

c A die is thrown 132 times with following results: — 10

Number turned up	1	2	3	4	5	6
Frequency	16	20	25	14	29	28

Is the die unbiased?

OR

6 a Provide a review on different types of measurement scales. — 10

b Describe the two categories of sources for secondary data collection. — 10

UNIT-4

7 a Compare Type I and Type II error. List at least six characteristics a hypothesis must possess. — 05

b A sample of 400 male students is found to have a mean height 67.47 inches. Can it be reasonably regarded as a sample from a large population with mean height 67.39 inches and standard deviation 1.30 inches? Test at 5% level of significance. — 05

c Genetic theory stats that children having one parent of blood type A and the other of blood type B will always be of one of three types, A, AB, B and that the proportion of three types will on an average be as 1:2:1. A report states that out of 300 children having one A parent and B parent, 30 per cent were found to be types A, 45 per cent type AB and remainder type B. Test the hypothesis by $\chi 2$ test. — 10

OR

8 a Setup an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots and state if the variety differences are significant. — 12

Plot of land	Per acre production data		
	Variety of wheat		
	A	B	C
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

b How is cluster analysis carried out? Identify the steps that need to be performed for arriving at an effective cluster. — 08

UNIT-5

9 a List and explain the different steps in writing a technical report. — 10

b Explain the concept and the purpose for the development of research proposal. — 10

OR

10 a Sketch a comprehensive layout of the research report. — 10

b Enumerate the components of a typical scientific research proposal. — 10

Nov/Dec-23 PG Examinations

R. V. COLLEGE OF ENGINEERING
(Autonomous Institution affiliated to VTU, Belagavi)
Common course to all M.Tech Programs

Research Methodology
22IM21T
MODEL QUESTION PAPER

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer FIVE full questions selecting one from each unit.
2. Each unit consists of two questions of 20 marks each.

		UNIT-1	
1	a	How can the research problems be classified, broadly?	4
	b	With the aid of an example, explain the different approaches of problem solving?	6
	c	Briefly identify the types in which a research problem can be classified.	4
		OR	
2	a	Identify a research problem in your respective domain and explain various steps involved in the research process?	10
	b	Distinguish between Quantitative and Qualitative research methods?	06
	c	What makes people to undertake research?	04
		UNIT-2	
3	a	Bring out the design and study phenomenon in Quasi-Experimental designs with examples.	10
	b	With the help of a flow chart, discuss how is the choice of experimental design for a given situation facilitated.	10
		OR	
4	a	Bring out the design and study phenomenon in Quasi-Experimental designs with examples.	10
	b	With the help of a flow chart, discuss how is the choice of experimental design for a given situation facilitated.	10
	c		4
		UNIT-3	
5	a	List and explain major probability sampling and non probability sampling.	10
	b	Describe the conditions and situations in which a Latin-Square design is used.	10
		OR	
6	a	With the help of a flow chart, discuss how is the choice of experimental design for a given situation facilitated.	10
	b	List out different methods of experimentation, with an example for each of them.	10
		UNIT-4	
7	a	What are the three most common measures of location? Also find the three measures of location for the given data: -10, -3, -3, -3, -7, -9.	06
	b	The table below shows the height, x, in inches and the pulse rate, y, per minute, for 9 people. Find the correlation coefficient and interpret your result.	08

x	68	72	65	70	62	75	78	64	68
y	90	85	88	100	105	98	70	65	72

Nov/Dec-23 PG Examinations

<table>
<tr><td></td><td>c</td><td>Distinguish between Type -1 and Type – II errors in the context of hypothesis testing.</td><td>06</td></tr>
<tr><td></td><td></td><td>OR</td><td></td></tr>
<tr><td>8</td><td>a</td><td>Set up an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots and state if the variety differences are significant.
<table>
<tr><td rowspan="2">Plot of land</td><td colspan="3">Per acre production data</td></tr>
<tr><td colspan="3">Variety of wheat</td></tr>
<tr><td></td><td>A</td><td>B</td><td>C</td></tr>
<tr><td>1</td><td>6</td><td>5</td><td>5</td></tr>
<tr><td>2</td><td>7</td><td>5</td><td>4</td></tr>
<tr><td>3</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>4</td><td>8</td><td>7</td><td>4</td></tr>
</table></td><td>10</td></tr>
<tr><td></td><td>b</td><td>Genetic theory states that children having one parent of blood type A and the other of blood type B will always be of one of three types, A, AB, B and that the proportion of three types will on an average be as 1 : 2 : 1. A report states that out of 300 children having one A parent and B parent, 30 per cent were found to be types A, 45 per cent per cent type AB and remainder type B. Test the hypothesis by $\chi 2$ test</td><td>7</td></tr>
<tr><td></td><td>c</td><td>Identify the important characteristics of $\chi 2$ test.</td><td>3</td></tr>
<tr><td></td><td></td><td>UNIT-5</td><td></td></tr>
<tr><td>9</td><td>a</td><td>Research report is a channel of communicating the research findings to the readers of the report. In the above context, it is necessary to take certain precautions for writing the research reports. Give an overview of certain precautions to be considered.</td><td>10</td></tr>
<tr><td></td><td>b</td><td>How important is ethics in carrying research?</td><td>4</td></tr>
<tr><td></td><td>c</td><td>Write short notes on “Bibliography and Footnotes”.</td><td>6</td></tr>
<tr><td></td><td></td><td>OR</td><td></td></tr>
<tr><td>10</td><td>a</td><td>What are the requirements of a good research report? Explain the structure of research report.</td><td>10</td></tr>
<tr><td></td><td>b</td><td>Write short notes on “Plagiarism in research”.</td><td>4</td></tr>
<tr><td></td><td>c</td><td>Investigate the usage of computers as a tool in your research, with a suitable example</td><td>6</td></tr>
</table>

Signature of Scrutinizer:
Name:

Signature of Chairman:
Name:

October-2023 PG Examinations

USN | 1 | RV | 22 | SCS | 12 |

22MCE22TL

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU, Belagavi)

II Semester Master of Technology (Computer Science and Engineering)

ADVANCES IN OPERATING SYSTEM

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

1. Each unit consists of two questions of 16 marks each.
2. Answer FIVE full questions selecting one from each unit (1 to 5).
3. Question No.11 lab component (compulsory).

UNIT - 1

1	a	Summarize the design goals that must be considered for the design and implementation of operating systems.	08
	b	Enumerate the Process *APIs* that are available on modern operating system.	05
	c	With suitable examples identify the low-level machinery and high-level intelligence needed by the operating system to effectively implement the virtualization of the *CPU*.	03
		OR	
2	a	Illustrate how programs are transformed into processes; explain how process creation actually works with a supporting diagram.	08
	b	Write a program that invokes fork(),execvp(), and wait() systems calls, to create a new process, the child process must call execvp() in order to run the word counting program on a source file, thus giving output as how many lines, words, and bytes are found in the file.	08

UNIT – 2

3	a	With a suitable example, explain the basic scheduling framework of Multi Queue Multi Processor Scheduling.	10
	b	Summarize the three different Linux multiprocessor schedulers.	06
		OR	
4	a	Analyze the operation of Single Queue Multiprocessor scheduling with a suitable example.	07
	b	Briefly explain cache coherence in multiprocessor architectures. Illustrate the solutions that are provided to solve the cache coherence problem.	06
	c	A multiprocessor scheduler should consider cache affinity when making its scheduling decisions. Justify	03

UNIT - 3

5	a	Write a multithreaded *C* program that uses pthread library to demonstrate the following: i) Creation of multiple threads ii) pthread_join to wait for the completion of threads iii) Simple Argument Passing to a Thread	08
	b	Write the code for implementing Michael and Scott Concurrent Queue	08

		OR	
6	a	Write a program to build a working Simple Spin Lock Using Test-and-set. Evaluate the effectiveness of the spinlocks.	08
	b	Describe the basic idea of approximate counter technique used for scalable counting.	08

UNIT - 4

7	a	Identify the various possible states a process can be in, indicated in the state field of the Linux process descriptor.	07
	b	Examine the main steps performed by do_fork() function of Linux operating system to set up the process descriptor and any other kernel data structure required for child process execution.	09
		OR	
8	a	Briefly explain the process removal operation in Linux operating system.	07
	b	The time quantum duration is critical for system performance with respect to scheduling. Justify.	04
	c	Analyze the different scheduling classes of Linux processes.	05

UNIT - 5

9	a	Discuss pre-emptive and Non-Pre-emptive kernels	05
	b	Explain the following: *i)* *Memory barriers in Linux* *ii)* *Per-CPU* Variables	06
	c	Summarize the needs for Protecting a data structure accessed by exceptions and Protecting a data structure accessed by interrupts.	05
		OR	
10	a	Summarize the various types of synchronization techniques used by the kernel with brief description and scope.	09
	b	Briefly explain about the kernel wrapper routines.	07
11	a	Write a program to implement Lock With Queues, Test-and-set, Yield, And Wakeup system calls.	10
	b	Write a program to demonstrate the use of Linux based Futex Locks	10

October-2023 PG Examinations

USN 1RV22SCS12

22MCE23T

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU, Belagavi)

II Semester Master of Technology (Computer Science and Engineering)

DEEP LEARNING

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

1. Each unit consists of two questions of 20 marks each.
2. Answer FIVE full questions selecting one from each unit (1 to 5).

UNIT - 1

1	a	Outline the strategies employed to estimate $\tilde{o}(x)$, where $\tilde{o}$ is a non-linear transformation of x in Multilayer Perceptron model.	06
	b	Give the following details for the Multilayer Perceptron shown in Fig. 1b,	

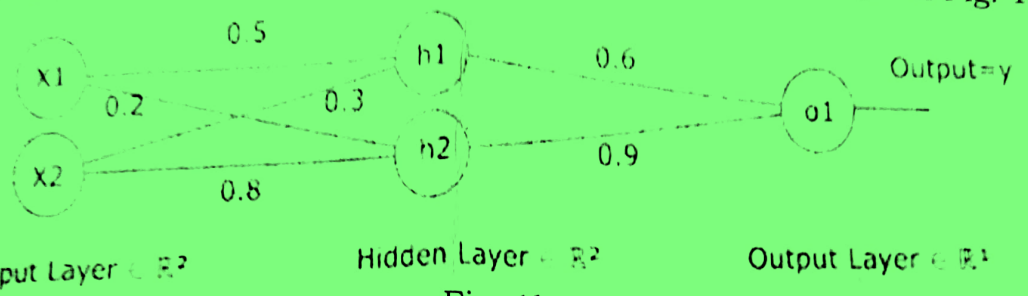

Fig. 1b

i. Hidden Layer Bias: b1=0.4, b2=0.1

ii. Output Layer Bias: b3=0.2

iii. With hidden layer and Output Layer with Sigmoid activation

Identify the output function and compute the Output y(forward) for the network input [0.5, 0.6] 08

c Discuss in detail L^2 parameter Regularization with relevant equations. 06

OR

2	a	Obtain the Loss function for maximum likelihood learning of a Bernoulli Parameterized by a Sigmoid Activation.	06
	b	Infer the meaning of the following terms: i. Width of the model ii. Cost function iii. Dataset Augmentation iv. Dropout	06
	c	For the graph $z = f(f(f(w)))$. Illustrate the computational graph with symbolic representation of derivatives during back propagation.	08

UNIT – 2

3	a	With relevant diagram and equations, illustrate the Convolution operation for 2-D data input.	06
	b	Justify the statement "Human visual cortex is the base for the Ideation of Convolutional Neural Networks".	06
	c	Illustrate the different types of data used in CNN models.	08

OR

4	a	With a neat diagram, investigate the core components of a typical convolutional neural networks.	10
	b	Describe the significance of Strides in CNNs with an example.	05
	c	Examine how to alter the kernels in CNNs to identify Horizontal Edges in the images during convolution operations.	05

UNIT - 3

5	a	With a neat diagram, investigate the LSTM cell in detail.	10
	b	Examine the various applications of RNN models, explain any 4 use-cases.	10
		OR	
6	a	Unroll an RNN three times in time t, t2, t3 and obtain an equation for the Output function for the same.	10
	b	Define Bidirectional RNNs. Discuss in detail.	10

UNIT - 4

7	a	What are undercomplete Autoencoders? Identify the significance of them.	10
	b	Discuss the various applications of the Autoencoders.	10
		OR	
8	a	Investigate how to model an Autoencoder that is capable of performing even when the inputs are corrupted or with noise.	10
	b	Illustrate Stochastic Encoders and decoders with relevant diagram and equations.	10

UNIT - 5

9	a	Sketch the core components of a Reinforcement Learning Paradigm. Outline the role of each component in brief.	10
	b	Evaluate the following pre-trained deep learning models: i. Google Net ii. VGG-16	10
		OR	
10	a	List different hyperparamaters used in Deep learning models. Justify the effect of tuning at least 4 Hyperparamaters to improvise the model performance.	10
	b	Explain the pros and cons of the transfer Learning paradigm.	10

October 2023 – PG Examination

USN | | | | | | | | | | |

22MCN2C4T

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU, Belagavi)

II Semester Master of Technology (Computer Network Engineering)

INTERNET OF THINGS AND EDGE COMPUTING

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

1. Each unit consists of two questions of 20 marks each.
2. Answer FIVE full questions selecting one from each unit.

UNIT-1

1	a	An IoT system has multiple levels. These levels are also known as tiers. Explain in detail about an IoT reference model suggested by CISCO that gives a conceptual framework for a general IoT system.	10
	b	Explain Various functional units in an MCU that are embedded in an IoT device or a physical object.	10
		OR	
2	a	Machine-to-machine refers to the process of communication of a physical object or device at machine with others of the same type, mostly for monitoring but also for control purposes. Explain the M2M Architecture in detail.	10
	b	OSI protocols mean a family of information exchange standards developed jointly by the ISO and the ITU-T. Explain in detail about modified OSI model for the IoT/M2M Systems.	10

UNIT-2

3	a	Explain in detail about Lightweight Machine-to-Machine Communication Protocol with a Suitable diagram.	10
	b	Explain the different terminologies used in Message Communication Protocols for Connected devices.	10
		OR	
4	a	Explain the following: i) MQTT Protocol ii) XMPP	10
	b	Define the following: i) Communication protocol ii) Application Programming Interface iii) Web service iv) Communication gateway v) Universal Resource Locator	10

UNIT-3

5	a	The Internet of Things (IoT) envisages new security challenges, including in the area of access control that can hardly be met by existing security solutions. Explain in detail about IoT@Work Capability Based Access Control System.	10
	b	From a security and privacy perspective, the developments in GAMBAS are centred on a secure distributed architecture in which data acquisition, data storage and data processing are tightly controlled by the user. What are the elements involved in security band privacy perspectives?	10

OR

6	a	Explain the following with respect to objectives and usage: i) Smart Transportation ii) Smart campus	10
	b	Explain in detail about trust and Quality-of–Information in an Open Heterogeneous Network.	10

UNIT-4

7	a	FEC provides a complement to the cloud in IoT by filling the gap between cloud and things towards providing service continuum. Explain the advantages by mentioning how FEC provides these advantages along with the diagram.	10
	b	Explain in detail about the Hierarchy of Fog and Edge Computing.	10

OR

8	a	Discuss about the Business models of FEC and also the opportunities and challenges involved in FEC.	10
	b	What can be done to overcome the limitation of current cloud-centric architecture? Explain with a neat diagram.	10

UNIT-5

9	a	Explain in detail about 5G Slicing Framework with a generic architectural diagram.	10
	b	Explain the following: i) Network-aware Virtual Machines Management ii) Virtual Network Functions Management	10

OR

10	a	With a neat diagram explain the Taxonomy of network-aware VM/VNF Management in software–defined Clouds.	10
	b	Write the short notes on: i) Mobile Edge Computing ii) Edge and Fog Computing	

Nov/Dec-22 PG Examinations

R. V. COLLEGE OF ENGINEERING
(Autonomous Institution affiliated to VTU, Belagavi)
II Semester M.Tech. (Computer Network Engineering)

Internet of Things and Edge Computing
22MCN2C4T
MODEL QUESTION PAPER

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer FIVE full questions selecting one from each unit.
2. Each unit consists of two questions of 20 marks each.

		UNIT-1	
1	a	Giving two proper definitions of Internet of Things (IOT), Identify different components that make up the IOT system by taking an use case of smart umbrella	10
	b	IOT is an amalgamation of many technologies. Identify the diverse technology environment used in following constituents of IOT • Hardware • Integrated Development Environment • Protocols • Communication • Network Backbone	10
		OR	
2	a	Give CISCO Conceptual framework for IOT. Identify different actions performed at each stage and also kind of components used at each stage.	10
	b	Explain difference in understanding the system by conceptual framework and architecture framework.	10
		UNIT-2	
3	a	With a neat diagram illustrate differentiate between Constrained RESTful Environment (CoRE) and Un constrained environment.	10
	b	Explain the following with respect to Web technology i) Communication gateway ii) Web object iii) Communication protocol iv) Web protocol v) Representational State Transfer (REST)	10
		OR	
4	a	Explain different features of Constrained Application Protocol (CoAP) which is for CoRE using ROLL data network.	10
	b	Briefly explain the following i) Java Script Object Notion (JSON) ii) Tag Length Value (TLV) Encoding	10
		UNIT-3	
5	a	Illustrate the following in the context of Internet of Things Privacy, Security and Governance i) **FP7 iCore Access Framework (iCore Contribution)**	10

Nov/Dec-22 PG Examinations

		ii) **IoT@Work Capability Based Access Control System (IoT@Work Contribution)**	
	b	In the context of SMARTIE, illustrate the dependability, Security and Privacy features	10
		OR	
6	a	Explain the notion of CapBAC (Capability Based Access Control) with an example that is inline with the **IoT@Work Capability Based Access Control System.**	10
	b	Illustrate the way the trust is established in FAIR (Fuzzy-Based aggregation providing in-network resilience)	10
		UNIT-4	
7	a	Illustrate BLUR challenges faced with Cloud-centric Internet of Things (CIoT)	10
	b	Analyse how the Fog and Edge Computing (FEC) nodes support acceleration in two aspects- networking acceleration and computing acceleration.	10
		OR	
8	a	Explain the features the Fog and Edge Computing (FEC) that complement the Cloud in IOT	10
	b	Differentiate between the Vertical Networking and Horizontal Networking of Fog and Edge Computing (FEC)	10
		UNIT-5	
9	a	Explain the concept of network slicing in Software Defined Clouds	10
	b	What is Network Slicing? Explain how this is done in 5G	10
		OR	
10	a	Illustrate the challenges faced while integrating IoT, Fog and Cloud	10
	b	Explain the advantages and dis advantages of network slicing management in Edge and Fog	10

Signature of Scrutinizer:
Name:

Signature of Chairman:
Name:

Oct-2023 PG Examinations

USN | 1 | R | V | 2 | 2 | S | C | S | 1 | 2 |

22HSS25T

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU, Belagavi)

II Semester Master of Technology

Common to All Branches

PROFESSIONAL SKILL DEVELOPMENT - I

Time: 02 Hours ***Maximum Marks: 50***

Instructions to candidates:

1. Answer ALL questions from Part A. (1 to 5).
2. Answer FIVE full question from part B. In part B, question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 and one full question from 5 and 6.

PART-A

1	1.1	What is Non-Verbal Communication?	02
	1.2	What are the three elements of great presentation?	02
	1.3	A is the father of C and D is the son of B. E is the brother of A if C is the sister of D. How H is related to E?	02
	1.4	A man starts from his office and goes $5km$ East, then turns to the left and again walks for $3km$, again he turns left and walks $5km$. At what distance is he from the starting point?	02
	1.5	Mention two do's for an effective interview.	02

PART-B

2	a	What are the differences between Formal and Informal Communication?	04
	b	Discuss the rules of Effective Communication.	04
3	a	Describe the steps to follow before presentation.	04
	b	What body language we should be having at the time of participating in GD?	04
		OR	
4	a	In a family, there are six members A, B, C, D, E and F. A and B are a married couple, A being the male member. D is the only son of C, who is the brother of A. E is the sister of D. B is the daughter-in-law of F, whose husband has died. How many male members are there in the family? Justify.	04
	b	Statement: "You are hereby appointed as a programmer with a probation period of one year and your performance will be reviewed at the end of the period for confirmation" – A line in an appointment letter. Assumptions: The performance of an individual generally is not known at the time of appointment offer. Generally an individual tried to prove his worth in the probation period. A: Only assumption I is implicit B: Only assumption II is implicit C: Either I or II is implicit D: Neither I nor II is implicit E: Both I and II are implicit Justify your answer.	04

5	a	What is Gesture? Give three examples of Gesture.	04
	b	Briefly explain the differences between Resume and Bio-data.	04
		OR	
6	a	Twelve friends are sitting in two rows parallel to each other such that they are at equal distance. In row A: AB, CD, EF, GH, IJ, KL are seated facing South Direction. In row B: PQ, RS, TU, VW, XY, ZA are seated facing North Direction. GH sits third right to CD, either GH or CD sits at the end of the row. The one facing CD sits second right to XY. Two people sit between RS and ZA, neither RS nor ZA sits at the end of the row. The immediate neighbor of RS is facing the person who sits third left to AB. EF and IJ are immediate neighbors. TU sits second left to PQ. IJ is not facing the immediate neighbor of VW. How many people are seated between KL and EF? Justify with a diagram.	04
	b	A child is looking for his father. He went 90*metres* in the east before turning to his right. He went 20*metre* before turning to his right again to look for his father at his uncle's place 30*metres* from this point. His father was not there. From there, he went 100*metres* to his north before meeting his father in a street. How far did the son meet his father from the starting point?	04
7	a	7 men standing in a row to be selected for a competition. Their names are Peritosh, Rajiv, Suresh, Vaibhav, Akshat, Aditya and Mahesh. Mahesh is standing left to Rajiv. Rajiv is not next to Vaibhav. Only one person is on left of Akshat Aditya is standing in the middle and between Peritosh and Suresh. Who is standing between Aditya and Akshat? Justify.	04
	b	How do you handle stress, pressure and anxiety?	04
8	a	What motivates you?	04
	b	Describe about a time you demonstrated leadership skills.	04