MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT OF HUMANITIES

EXAMINATION: Minor   **MONTH & YEAR:** March 2013

Course: B.Tech
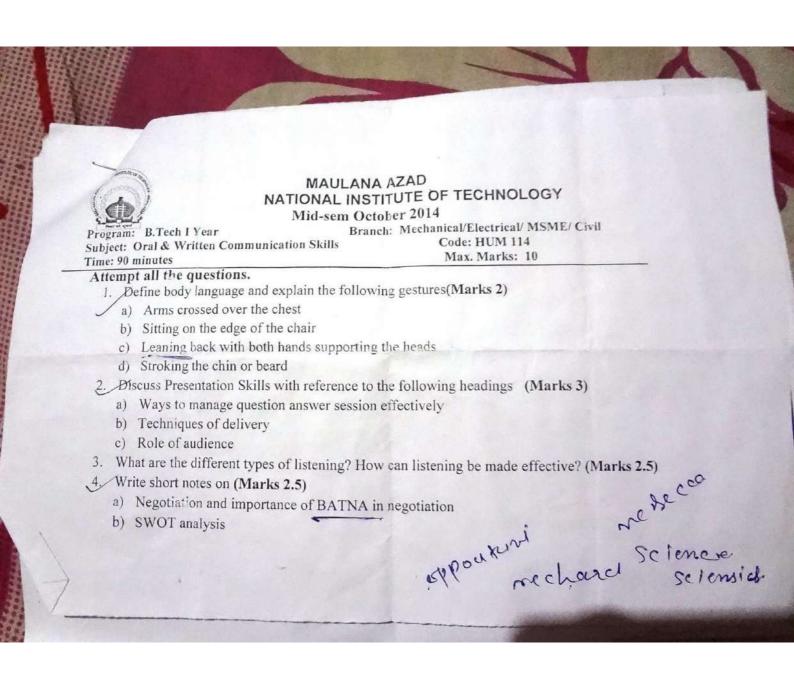Subject Name: Oral and Written Communication Skills
Time: 90 minutes
Note: Answer all questions.

Branch: CSE/CHEM/EC
Subject Code: HUM 1114
Max Marks: 20

S No.	Question	Marks
1.	Communication is the process of sending and receiving information. Explain the communication process in the light of this statement. Draw the communication cycle to support your answer.	5
2.	Discuss the barriers to listening in detail and give suggestions to overcome each one of them.	5
3.	Write short notes on a) SWOT b) Positive attitude	5
4.	Discuss Presentation Skills with reference to the following headings a) Importance of Body Language b) Role of audience c) Voice Modulation	5

MAULANA AZAD
NATIONAL INSTITUTE OF TECHNOLOGY
Mid-sem October 2014

Program: B.Tech I Year   Branch: Mechanical/Electrical/ MSME/ Civil
Subject: Oral & Written Communication Skills   Code: HUM 114
Time: 90 minutes   Max. Marks: 10

Attempt all the questions.

1. Define body language and explain the following gestures(**Marks 2**)
    a) Arms crossed over the chest
    b) Sitting on the edge of the chair
    c) Leaning back with both hands supporting the heads
    d) Stroking the chin or beard

2. Discuss Presentation Skills with reference to the following headings   (**Marks 3**)
    a) Ways to manage question answer session effectively
    b) Techniques of delivery
    c) Role of audience

3. What are the different types of listening? How can listening be made effective? (**Marks 2.5**)

4. Write short notes on (**Marks 2.5**)
    a) Negotiation and importance of BATNA in negotiation
    b) SWOT analysis

NAL INSTITUTE OF TECHNOLOGY

EXAMINATION: End Term

MONTH & YEAR: May 2013

Course: B.Tech
Subject Name: Oral and Written Communication Skills
Time: Three Hours
Note: Answer all questions.

Branch: CSE/CHEM/EC
Subject Code: HUM114
Max Marks: 60

S No.		Question	Marks
1.	(a)	Communication barriers are the negative forces that may affect the effectiveness of communication. Elaborate	7
	(b)	Differentiate between the following: i. Minutes and Agenda ii Glossary and Index	3
2.	(a)	Comment on the importance of body language for success in an interview	7
	(b)	Write short notes on: i. Use of visual aids in presentation ii Types of reading	3
3.	(a)	Sender can improve effectiveness of communication by planning the whole thing. Mention the things the sender should plan for successful communication	7
	(b)	Give five reasons for choosing oral mode of communication instead of written form.	3
4.	(a)	With reference Group Discussion write short notes on the following i. Aggressiveness ii. Use of Body Language iii. Objective of Group Discussion iv. Importance of listening skills	7
	(b)	Identify three uses of pauses when presenting your message to an audience.	3
5.	(a)	Discuss the various types of leadership styles	7
	(b)	Describe the factors affecting the success of negotiation	3
6.	(a)	You, as the member of Students' Council of Maulana Azad National Institute of Technology Bhopal, are directed by the Dean Student's Affair to prepare a report on ways to improve the existing parking facilities for four-wheeler and two wheeler vehicles in your campus. Invent the necessary details and prepare the report in memo form.	5
	(b)	Assume that 12 air conditioners out of 50 have been received by your firm in damaged condition from Jupiter Electrical Appliances Co. Ltd., 20 Park Street, New Delhi 11. As the Manager of your firm write a complaint letter to the supplier, seeking replacement or adjustment for the damaged goods. Invent the necessary details.	

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
Department of Humanities & Social Sciences

EXAMINATION: End Term

MONTH & YEAR: April 2015

Course: B. Tech
Subject: Oral & Written Communication Skills

Branch: Electronics/CSE/ Chemical
Subject Code: HUM 114

Time: Three Hours

Max Marks: 60

Note: Answer all questions.

S No.	Question	Marks
1.	**Answer in brief** i. Define Noise. ii. What role does courtesy play in a business letter? iii. What is the importance of minutes in a meeting? iv. Who is an Ombudsperson?	10
2.	Communication is not always successful. Several things can prevent the message from reaching the intended recipient or from having the desired effect on the recipient. Explain?	10
3.	Discuss the importance of interpersonal skills and suggest ways to enhance them.	10
4.	Write short notes on: a) Reading process b) Types of reports	10
5.	Prepare a suitable resume that you would submit to the HR section of an Engineering firm. *job application too*	10
6.	Write short notes on each of the following terms with special reference to job interviews. i. Types of questions ii. Body language	10

Name of the student _____   Roll No. _____

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY 50
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

EXAMINATION: End Term   MONTH & YEAR: November 2015

Course: B. Tech   Branch: Civil/ Mechanical/Electrical/ MSME
Subject: Oral & Written Communication Skills   Subject Code: HUM 114

Max Marks: 60

Time: Three Hours
Note: Answer all questions.

S No.	Question	Marks
1.	a. Provide antonyms and synonyms of the following: i) Autocratic ii) Candid b. Differentiate between bibliography and reference c. What is an agenda (with reference to meeting)? d. Define negotiation? e. What do you understand by the body language of a letter?	10
2.	Draft a letter on behalf of Messrs Robinson & Sons, MMK Road Chennai-130058, placing an order to The National Furnishing Company Abid Road Hyderabad for office furniture. (Invent necessary details).	10
3.	Describe the process of communication, indicating clearly the role of each constituent element.	10
4.	Highlight the importance of time management skills and suggest ways to improve it. Discuss external and internal time wasters.	10
5.	Write short notes on : a) 7 C's of communication b) Positive attitude c) Stress Interview	10
6.	Write short notes on each of the following terms with special reference to group discussion a) Leadership Skills b) Communication skills c) Body language d) Creativity /out of box thinking	10

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

EXAMINATION: End Term   MONTH & YEAR: April 2016

Course: B. Tech   Branch: CSE/ Chemical/Electronics
Subject: Oral & Written Communication Skills   Subject Code: HUM 114

Time: Three Hours   Max Marks: 60

S No.	Question	Marks
1.	a. Differentiate between written and oral communication. b. What is a Preface? c. Define communication? d. Define agenda?	10
2.	Draft an application in response to the following advertisement in The Times of India dated 29 March 2016 Government of India owned Public Sector Undertakings Companies / Organizations- BHEL, BEL, Coal India, HPCL, EIL and BPCL invites application for 23 posts of junior engineers. Educational Qualification - B.Tech full time regular course/s from AICTE approved / UGC recognized University/Deemed University. Engineering Disciplines: Civil Engineering, Electrical Engineering, Mechanical Engineering, Electronics Engineering, Computer Engineering and Chemical Engineering.	10
3.	Actions speak louder than words and thus, Kinesics provides a deeper insight into the sender's message. Elucidate.	10
4.	Write short notes on each of the following terms with special reference to presentation a) Handling questions after presentation. b) Use of audio-visual aids	10
5.	A leader motivates and stimulates his /her followers towards achievement of organisational goals by setting aside their own interest, in the light of this statement discuss the traits of a good leader.	10
6.	Write short notes on: a) Reading Skills b) Socio-psychological Barriers	10

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

EXAMINATION: End Term   **MONTH & YEAR:** Nov 2017

Course: B. Tech   Branch: Electrical/ Civil/Mech / MSME
Subject: Oral & Written Communication Skills   Subject Code: HUM 114
Time: Three Hours   Max Marks: 60

Note: Answer all questions.

S No.		Question	Marks
1.	(a)	Listening plays a vital role in all types of communication, sometimes superseding the importance of speaking". Explain. Discuss how an individual can improve the listening skills.	5
	(b)	Discuss three main barriers to communication and suggest ways to avoid them.	5
2.	(a)	Explain the need and importance of an oral presentation. What factors should one keep in mind to give an effective oral presentation?	5
	(b)	Explain with illustration why it is important to adopt the message to the needs of the receiver.	5
3.	(a)	"In business communication courtesy and clarity are as important as conciseness and completeness" Discuss.	5
	(b)	What is the objective behind conducting Group Discussions? Highlight the specific skills that are tested in the process. *and resume*	5
4.	(a)	Draft an application in response to the following advertisement in The Times of India dated 10 December 2017 Government of India owned Public Sector Undertakings Companies / Organizations- BHEL, BEL, Coal India, HPCL, EIL and BPCL invites application for 23 posts of junior engineers. Educational Qualification - B.Tech full time regular course/s from AICTE approved / UGC recognized University/Deemed University. Engineering Disciplines: Civil Engineering, Electrical Engineering, Mechanical Engineering, Electronics Engineering, Computer Engineering and Chemical Engineering.	5
	(b)	Define report and discuss qualities of a report.	5
5.	(a)	What do you understand by leadership? What characteristics should one essentially possess to be an effective leader?	5
	(b)	Write short notes on: (a) SWOT analysis (b) Main Body of a report	5
6.	(a)	Highlight the importance of time management skills and explain external and internal time wasters	5
	(b)	Discuss the body language strategies to be followed during an interview.	5

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
EXAMINATION: End Term   MONTH & YEAR: November 2016

Course: B. Tech   Branch: Mech/ Civil/ MSME/Electrical
Subject: Oral & Written Communication Skills   Subject Code: HUM 114

Time: Three Hours   Max Marks: 60

S No.		Question	Marks
1.	(a)	What are the traits and skills which determine effectiveness of a leader? Discuss different types of leadership	7
	(b)	What are the 7C's of communication?	3
2.	(a)	Communication is sharing of understanding'. Discuss in detail and bring out the process of communication.	7
	(b)	What are the necessary steps to be taken before calling a meeting?	3
3.	(a)	Discuss the process of a job interview in detail.	7
	(b)	What is the importance of eye contact during an interview?	3
4.	(a)	Communication barriers are the negative forces that may affect the effectiveness of communication. Elaborate.	7
	(b)	Differentiate between listening and hearing.	3
5.	(a)	Your Company sent an order of 15 Printers (HP Laser Jet 1020) to National Systems Limited Hyderabad but you received only 10 Printers. As a Purchase Manager of Nigam Computers, Mandideep Bhopal write a letter to the General Manager(Sales and Marketing) National Systems Limited Hyderabad making a complaint and asking him to send the remaining five Printers.	7
	(b)	What do you understand by the body language of a letter?	3
6.	(a)	Discuss the personality traits of participants that are evaluated in a group discussion.	7
	(b)	What are time wasters and how can they be avoided?	3

Minor I   **Hum 101**   09/09/2011   Time 1 hr.   **BE Civil 1 Semester**

Q1 Fill in the correct option. (4marks)

a) To ensure clarity in communication we must_____ barriers to communication and _____ them.

    A)   Remove, minimize
    B)   Minimize, remove
    C)   Minimize, identify
    D)   Identify, minimize

b) _____ is active and _____ is passive process

    A)   Hearing and thinking
    B)   Listening and hearing
    C)   Writing and listening
    D)   Hearing and writing

c) Communication is absolutely essential for_____ and _____ in this world.

    A)   Origin, growth
    B)   Origin, existence
    C)   Survival, existence
    D)   None of the above

d) Communication brings about_____ and leads to _____.

    A)   Change, New action
    B)   Reaction, Action.
    C)   Precaution, Prevention
    D)   Action, Prevention

Q2 "Actions speak louder than words." Explain the statement with reference to the importance of non-verbal communication.(2 Marks)

Q3 Explain the ABC of letter writing.(2 marks)

Q4 Explain the physical barriers with examples.(2marks)

Maulana Azad National Institute of Technology
Bhopal
Oral and Written Communication Skills (Hum 151)

13/10/2011   BE Civil 1 Semester   Minor 2   Time: 1 hr.

Q1. What is a memo? How is it different from a letter? Assume that you the President of MANIT student's Association. The Association is organizing a one day workshop on Positive Attitude and Happy Life on 21 October 2011. Write a memo to inform all the members of the association about it and ensure their attendance. (3 marks)

Q.2 Read the following case and answer the question:-   Rakesh is in a management consultancy company and despite knowing what he should be doing, time management-wise, Rakesh wasn't doing it! He found himself getting seriously side tracked by emails – He was checking them every few minutes and was then diverted to solving other people's problems all day rather than getting on with his work. In addition, as he was so busy, he didn't have any boundaries in place about how late he should work. He often found himself working all hours and most weekends. He was throwing money at solving his shortage of time to achieve any semblance of an ordered life. For example, he sent all his clothes to a laundry and would often buy himself little treats to cheer himself up. He would also book in for a massage on his way back from the office. All these compensatory treats were costing him a fortune and getting him into an income short fall every month.   **Suggest some simple tools to Rakesh so that he gets more focussed and falls into a healthy work life balance routine.** (3 marks)

Q3. What do you understand by interpersonal skills? Positive interpersonal communication can help you lead a better and healthier life. Do you agree? Why? (2 marks)

Q4. Prepare your resume with a few lines about yourself stating the aims and objectives, your strengths and major accomplishments of your life. (2 marks)

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

Department of Humanities & Social Sciences

Examination: Mid Term   **Month & Year:** October 2016

Course: B. Tech (Sem-I)	Branch: MSME/Mechanical/Civil/Electrical
Subject: Oral & Written Communication Skills	Subject Code: HUM 114
Time: 90 minutes	Max Marks: 20
Note: Answer all questions.	

SNo	Question	Marks
1.	What changes has computer technology brought about in the field of communication? State its merits and demerits.	5
2.	Explain how the following contribute towards effective communication: a) Feedback b) Control of emotions	5
3.	Define negotiation and discuss factors affecting negotiation.	5
4.	Elaborate the important points that you will keep in mind while preparing for an oral presentation	5

Anxiety)

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT OF HUMANITIES

Examination: Mid-sem

Course: B. Tech

Subject: Oral and Written Communication Skills

Time: 90 minutes

Month & Year: March 2017

Branch: CSE/CHEM/EC

Subject Code: HUM151

Max Marks: 20

S No.	Question	Marks
1.	Communication is the process of sending and receiving information. Explain the communication process in the light of this statement.	5
2.	Discuss barriers to listening in detail and give suggestions to overcome each one of them.	5
3.	Write short notes on a) Negotiation b) Positive attitude	5
4.	Discuss Presentation Skills with reference to the following headings a) Importance of Body Language b) Role of audience c) Voice Modulation d) Place of Presentation	5

MAULANA AZAD
NATIONAL INSTITUTE OF TECHNOLOGY
Mid-sem March - 2015

Program: B.Tech I Year   Branch: Electronics/ Chemical/CSE
Subject: Oral & Written Communication Skills   Code: HUM 114
Time: 1.00-Hour   Max. Marks: 10 2 0

Attempt all the questions.

I. How does the sender's dress and appearance make impacts upon his / her communication? (Marks 2.5)

II. How can oral communication be made effective? Compare and contrast oral communication with written communication. (Marks 2.5)

III. Discuss the general principles of effective communication (Marks 2.5)

IV. Write short notes on   a) SWOT Analysis   b) Use of visual aids in presentation (Marks 2.5)

3	a.	Find the radius of curvature at the point (x,y) of the curve $x^{2/3}+y^{2/3}=a^{2/3}$, show that radius of curvature at any point (x,y) of the curve $x^{2/3}+y^{2/3}=a^{2/3}$ is three times the perpendicular from the origin to the tangent at (x,y).	3
	b	If p and q are the intercepts of any tangent line to the curve $\left(\dfrac{x}{a}\right)^{1/2}+\left(\dfrac{y}{b}\right)^{1/2}=1$, then prove that $\dfrac{p}{a}+\dfrac{q}{b}=1$	3
	c.	Trace the curve $x^3+y^3=3axy$.	3
4	a.	Test the convergence of the series, $1+\dfrac{2x}{2!}+\dfrac{3^2x^2}{3!}+\dfrac{4^3x^3}{4!}+\ldots\ldots\ldots$	3
	b.	Find the length of the curve $y=\log\dfrac{e^x-1}{e^x+1}$ from $x=1$ to $x=2$.	3
	c.	Find the volume of the spindle shaped solid generated by revolving the astroid $x^{2/3}+y^{2/3}=a^{2/3}$ about the x-axis.	3

| 5 | a. | Find the equations to the lines of regression and the coefficient of correlation for the following data : | 3 |

x	2	4	5	6	8	11
y	13	12	10	8	7	5

| | b. | Fit a Poisson distribution to the following data which gives the number of yeast cells per square for 400 square : (It is given that $e^{-1.32}=0.2674$) | 3 |

No. of cells Per square(x)	0	1	2	3	4	5	6	7	8	9	10
No. Of Squares(f)	103	143	98	42	8	4	2	0	0	0	0

| | c. | A fertilizer mixing machine is set to give 12 kg of nitrate for quintal bag of fertilizer. Ten 100 kg bags are examined. The percentages of nitrate per bag are as follows: 11,14,13,12,13,12,13,14,11,12 .Is there any reason to believe that the machine is defective? Value of t for 9 degrees of freedom is 2.262. | 3 |

6	a.	Find the perticular integral of the equation, $\dfrac{d^2x}{dt^2}+2n\cos\alpha\dfrac{dx}{dt}+n^2x=a\cos nt$, which is such that when t=0, x=0 and $\dfrac{dx}{dt}=0$	3
	b.	Solve the given differential equation, $(1+x)^2\dfrac{d^2y}{dx^2}+(1+x)\dfrac{dy}{dx}+y=4\cos\log(1+x)$	3
	c.	Solve the following differential equation, $(xy\sin xy+\cos xy)y\,dx+(xy\sin xy-\cos xy)x\,dy=0$	3

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY BHOPAL
(Deemed University)
End Term Examination (December, 2008)

B.Tech I Sem
Time: 3 Hours
Note: Attempt all Questions. Attempt any two pa. from each question except Question no.
I.

Branch: All Branches
Code: MTH-101

Subject: Engg. Mathematics
Max. Marks: 40

Q. No.		Question	Marks
1	i	The solution of the differential equation $y\dfrac{dy}{dx} = x - 1$ satisfying $y(1)=1$ is - (a) $y^2 = x^2 - 2x + 2$ (b) $y = 2x^2 - x - 1$ (c) $y = x^2 - 2x + 2$ (d) $y^2 = 2x^2 - x - 1$	01
	ii	The volume of the solid generated by revolving the circle $x^2 + y^2 = a^2$ about y-axis is, (a) $\dfrac{2}{3}\pi a^2$, (b) $\dfrac{4}{3}\pi a^2$, (c) $\dfrac{2}{3}\pi a^3$, (d) $\dfrac{2}{3}\pi a^4$	01
	iii	The maximum value of $\sin x(1+\cos x)$ is : (a) 3 (b) $3\sqrt{3}/4$ (c) 4 (d) $3\sqrt{3}$	01
	iv	If $u = \sin^{-1}(y/x)$, then the value of $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y}$ is, (a) 0, (b) -1, (c) 1, (d) 2	01
	v	In the cycloid $x = t+\sin t$, $y = 1-\cos t$, then ρ is, (a) $4\cos(t/2)$, (b) $\cos(t/2)$, (c) $4\cos t$, (d) $\cos t$	01
	vi	Solve : $\lim_{n \to \infty} \sum_{r=1}^{n} \dfrac{n^2}{\left(n^2 + r^2\right)^{3/2}}$	02
	vii	Let X be a poisson random variable, such that $2P(X=0) = P(X=2)$ then Standard deviation of x is: (a) 4, (b) 2, (c) $-\sqrt{2}$, (d) $\sqrt{2}$	01
	viii	The slope of the normal at the point $(at^2, 2at)$ of the parabola $y^2 = 4ax$ is (a) $1/t$, (b) t, (c) $-t$, (d) $-1/t$	01
	ix	Find the Binomial distribution whose mean is 5 and variance is 10/3.	01
2	a.	If $u = \left(1 - 2xy + y^2\right)^{-1/2}$ then prove that, $\dfrac{\partial}{\partial x}\left\{\left(1 - x^2\right)\dfrac{\partial u}{\partial x}\right\} + \dfrac{\partial}{\partial y}\left(y^2 \dfrac{\partial u}{\partial y}\right) = 0$	3
	b.	Divided 24 into three parts such that the continued product of the first, square of the second and cube of third is maximum.	3
	c.	Use the method of the Lagrange's multipliers to find the volume of the largest rectangular parallelopiped that can be inscribed in the ellipsoid $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$	3

EXAMINATION : END TERM

MONTH & YEAR: NOV.-2012

Course: B. Tech

Semester: 1   Branch :C/CSE/CHEM/E/EL/M/MSME

Subject: Mathematics-I

Subject Code:MTH-111

Time: 180 minutes

Max Marks:60

Note: All questions are compulsory.

Q. No	Question	Marks
1(a)	Expand $e^x \cos y$ in powers of x and $y - \dfrac{\pi}{2}$, by Taylor's series.	03
(b)	If $x^x y^y z^z = c$, show that $\dfrac{\partial^2 z}{\partial x \partial y} = -(x \log ex)^{-1}$, when $x = y = z$.	03
(c)	If $u = f\left\{ \dfrac{y-x}{xy}, \dfrac{z-x}{xz} \right\}$ then show that $x^2 \dfrac{\partial u}{\partial x} + y^2 \dfrac{\partial u}{\partial y} + z^2 \dfrac{\partial u}{\partial z} = 0$	04
2(a)	If $u = x \sin^{-1} \dfrac{y}{x} + \tan^{-1} \dfrac{x}{y}$, then show that $$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 0 .$$	03
(b)	Discuss the maxima and minima of the function $x^2 y^2 - 5x^2 - 5y^2 - 8xy$.	03
(c)	Use the method of the Lagrange's multipliers; prove that the rectangular solid of maximum volume that can be inscribed in a sphere is a cube.	04
3(a)	Discuss the convergence of the series: $$\frac{x}{1} + \frac{1}{2} \cdot \frac{x^3}{3} + \frac{1.3}{2.4} \cdot \frac{x^5}{5} + \frac{1.3.5}{2.4.6} \cdot \frac{x^7}{7} + \cdots \cdots \cdots \quad (x > 0)$$	05
(b)	Find the length of the arc of the leminiscate $r^2 = a^2 \cos 2\theta$.	05
4(a)	Evaluate $\displaystyle \lim_{n \to \infty} \left[\left(1 + \frac{1}{n}\right)\left(1 + \frac{2}{n}\right) \cdots \left(1 + \frac{n}{n}\right) \right]^{1/n}$.	03
(b)	Find the area of the surface formed by the revolution of the curve $x^2 + 4y^2 = 16$ about x-axis.	03
(c)	Show that $\displaystyle \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx = \beta(m,n)$.	04

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT MATHEMATICS

EXAMINATION : END TERM

MONTH & YEAR: NOV.-2012

Course: B. Tech

Semester: 1   Branch :C/CSE/CHEM/E/EL/M/MSME

Subject: Mathematics-I

Time: 180 minutes

Subject Code:MTH-111

Max Marks:60

Note: All questions are compulsory.

Q No	Question	Marks
1(a)	Expand $e^x \cos y$ in powers of x and $y - \dfrac{\pi}{2}$, by Taylor's series.	03
(b)	If $x^x y^y z^z = c$, show that $\dfrac{\partial^2 z}{\partial x \partial y} = -(x \log ex)^{-1}$, when $x = y = z$.	03
(c)	If $u = f\left\{\dfrac{y-x}{xy}, \dfrac{z-x}{xz}\right\}$ then show that $x^2 \dfrac{\partial u}{\partial x} + y^2 \dfrac{\partial u}{\partial y} + z^2 \dfrac{\partial u}{\partial z} = 0$	04
2(a)	If $u = x \sin^{-1} \dfrac{y}{x} + \tan^{-1} \dfrac{x}{y}$, then show that $$x^2 \dfrac{\partial^2 u}{\partial x^2} + 2xy \dfrac{\partial^2 u}{\partial x \partial y} + y^2 \dfrac{\partial^2 u}{\partial y^2} = 0 .$$	03
(b)	Discuss the maxima and minima of the function $x^2 y^2 - 5x^2 - 5y^2 - 8xy$.	03
(c)	Use the method of the Lagrange's multipliers; prove that the rectangular solid of maximum volume that can be inscribed in a sphere is a cube.	04
3(a)	Discuss the convergence of the series: $$\dfrac{x}{1} + \dfrac{1}{2} \cdot \dfrac{x^3}{3} + \dfrac{1.3}{2.4} \cdot \dfrac{x^5}{5} + \dfrac{1.3.5}{2.4.6} \cdot \dfrac{x^7}{7} + \ldots\ldots\ldots \quad (x > 0)$$	05
(b)	Find the length of the arc of the leminiscate $r^2 = a^2 \cos 2\theta$.	05
4(a)	Evaluate $\displaystyle \lim_{n \to \infty} \left[\left(1 + \dfrac{1}{n}\right)\left(1 + \dfrac{2}{n}\right)\ldots\ldots\left(1 + \dfrac{n}{n}\right)\right]^{1/n}$.	03
(b)	Find the area of the surface formed by the revolution of the curve $x^2 + 4y^2 = 16$ about x-axis.	03
(c)	Show that $\displaystyle \int_0^1 \dfrac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx = \beta(m, n)$.	04

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MATHEMATICS

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EXAMINATION : END TERM   MONTH & YEAR: April-2012

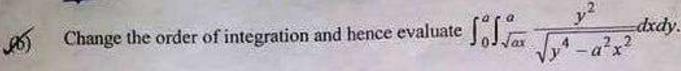Course: **B.TECH.**   Semester: **II**   Branch :C/CSE/CHEM/E/EL/M/MSME

Subject Name: **MATHEMATICS-II**   Subject Code:151

Time: **180 minutes**   Max Marks:60

Note: **All questions are compulsory.**

Q. No	Question	Marks
1(a)	Find the smaller of the area bounded by the ellipse $4x^2 + 9y^2 = 36$ and the straight line $2x + 3y = 6$ as a double integral.	03
(b)	Change the order of integration in the following integral and hence evaluate: $$\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dx\, dy .$$	03
(c)	Solve in series the equation $(1+x^2)\dfrac{d^2 y}{dx^2} + x\dfrac{dy}{dx} - y = 0$	04
2(a)	Find the image of the infinite strip $\dfrac{1}{4} \le y \le \dfrac{1}{2}$ under the transformation $w = \dfrac{1}{z}$ .Also show the region graphically.	03
(b)	Obtain the Taylor's or Laurent's series which represent the function $$f(z) = \frac{1}{(1+z^2)(z+2)} \text{ when } 1 < |z| < 2 .$$	03
(c)	Evaluate $\displaystyle\int_C \dfrac{\sin z}{z\cos z} dz$, where C is the circle $|z| = 2$.	04
3(a)	A vector field is given by $\vec{A} = (x^2 + xy^2)\hat{i} + (y^2 + x^2 y)\hat{j}$. Show that the field is irrotational and find the scalar potential function.	04

5(a)	Solve: $e^{3x}(p-1)+p^3e^{2y}=0$, where $p=\dfrac{dy}{dx}$.	03
(b)	Solve: $\dfrac{d^2y}{dx^2}-4\dfrac{dy}{dx}+4y=8x^2e^{2x}\sin 2x$.	04
(c)	Solve: $x^2\dfrac{d^2y}{dx^2}+4x\dfrac{dy}{dx}+2y=e^{\ x}$	03
6(a)	Solve $\dfrac{dx}{dt}-\dfrac{dy}{dt}+2y=\cos 2t$, $\dfrac{dx}{dt}+\dfrac{dy}{dt}-2x=\sin 2t$.	05
(b)	Solve: $\dfrac{d^2y}{dx^2}-2\dfrac{dy}{dx}+2y=e^{x}\tan x$, by the method of variation of parameter.	05

(b)   Change the order of integration and hence evaluate $\int_0^a \int_{\sqrt{ax}}^a \dfrac{y^2}{\sqrt{y^4 - a^2 x^2}} dx\, dy$.   03

(c)   Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 3$ and $z = 0$.   04

4(a)   Solve: $(xy^2 - e^{x^3}) dx - x^2 y\, dy = 0$.   03

(b)   Solve: $e^{4x}(p - 1) + e^{2y} p^2 = 0$, where $p = \dfrac{dy}{dx}$.   03

(c)   Solve: $x^2 \dfrac{d^2 y}{dx^2} + 4x \dfrac{dy}{dx} + 2y = e^x$.   04

5(a)   Determine k such that the system of homogeneous equations   05
$$2x + y + 2z = 0$$
$$x + y + 3z = 0$$
$$4x + 3y + kz = 0$$
has (i) trivial solution (ii) nontrivial solution. Find the nontrivial solution.

(b)   Find the characteristic equation of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence compute   05

A^{-1}.   Also   find   the   matrix   represented   by
$A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$.

6(a)   Define rank of a matrix. Find the rank of a matrix $\begin{bmatrix} 1^2 & 2^2 & 3^2 & 4^2 \\ 2^2 & 3^2 & 4^2 & 5^2 \\ 3^2 & 4^2 & 5^2 & 6^2 \\ 4^2 & 5^2 & 6^2 & 7^2 \end{bmatrix}$ 05

(b)   Solve the simultaneous equations: 05
$\dfrac{dy}{dt} + 5x - 2y = t$, $\dfrac{dx}{dt} + 2x + y = 0$, given that $x = y = 0$ when $t = 0$.