COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH. DEGREE I & II SEMESTER SUPPLEMENTARY EXAMINATION IN MARINE ENGINEERING JUNE 2020

MRE 1101 ENGINEERING MATHEMATICS I

(*2013 Scheme*)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet]
Max. Marks: 14

INSTRUCTIONS

1. You have to be available in Google Meet on demand by the faculty.
2. You have to share your '**live location**' to the faculty before uploading the answer sheet.
3. You have to answer only one question.
4. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
5. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
6. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
7. You have to put the Question Number correctly.
8. After answering the question, you have to scan and upload the answer page.

MODULE - I

(Answer ***ANY ONE*** question)

I(1). (a) Evaluate $\lim_{x\to 1} \dfrac{x^x - x}{x - 1 - \log x}$. (7)

(b) Find the nth derivative of $e^{2x}\cos^2 x \sin x$. (7)

OR

I(2). (a) Prove that the radius of curvature at any point of the astroid $x^{2/3} + y^{2/3} = a^{2/3}$ is three times the length of perpendicular from the origin to the tangent at that point (7)

(b) Find the asymptotes of the curve $x^3 + 3x^2y - 4y^3 - x + y + 3 = 0$. (7)

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH. DEGREE I & II SEMESTER SUPPLEMENTARY EXAMINATION IN MARINE ENGINEERING JUNE 2020

MRE 1101 ENGINEERING MATHEMATICS I

(*2013 Scheme*)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet]
Max. Marks: 14

INSTRUCTIONS

1. You have to be available in Google Meet on demand by the faculty.
2. You have to answer only one question.
3. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
4. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
5. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
6. You have to put the Question Number correctly.
7. After answering the question, you have to scan and upload the answer page.

MODULE - II

(Answer ***ANY ONE*** question)

II(1). If $u = u\left(\frac{y-x}{xy}, \frac{z-x}{xz}\right)$ show that $x^2\frac{\partial u}{\partial x} + y^2\frac{\partial u}{\partial y} + z^2\frac{\partial u}{\partial z}$ (14)

OR

II(2). A rectangular box open at the top is to have volume of 32 cubic feet. Find the dimensions of the box requiring least material for its construction. (14)

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH. DEGREE I & II SEMESTER SUPPLEMENTARY EXAMINATION IN MARINE ENGINEERING JUNE 2020

MRE 1101 ENGINEERING MATHEMATICS I

(*2013 Scheme*)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet]
Max. Marks: 14

INSTRUCTIONS

1. You have to be available in Google Meet on demand by the faculty.
2. You have to answer only one question.
3. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
4. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
5. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
6. You have to put the Question Number correctly.
7. After answering the question, you have to scan and upload the answer page.

MODULE - III

(Answer ***ANY ONE*** question)

III(1). Find the focus and length of latus rectum of the ellipse $\frac{x^2}{4} + \frac{y^2}{3} = 1$. (14)

OR

III(2). (a) Find the vertex, focus, directrix and length of latus rectum of the parabola $y^2 - 8x - 2y + 5 = 0$. (7)

(b) Find the condition that $y = mx + c$ touch the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. (7)

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH. DEGREE I & II SEMESTER SUPPLEMENTARY EXAMINATION IN MARINE ENGINEERING JUNE 2020

MRE 1101 ENGINEERING MATHEMATICS I

(*2013 Scheme*)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet]
Max. Marks: 14

INSTRUCTIONS

1. You have to be available in Google Meet on demand by the faculty.
2. You have to answer only one question.
3. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
4. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
5. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
6. You have to put the Question Number correctly.
7. After answering the question, you have to scan and upload the answer page.

MODULE - IV

(Answer ***ANY ONE*** question)

IV(1). (a) Find the reduction formula for $\int cos^m x\, dx$. (7)

(b) Find the area common to the parabola $y^2 = ax$ and the circle $x^2 + y^2 = 4ax$. (7)

OR

IV(2). Calculate the volume of the solid bounded by the planes (14)
$x = 0, y = 0, x + y + z = a$ and $z = 0$.

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH. DEGREE I & II SEMESTER SUPPLEMENTARY EXAMINATION IN MARINE ENGINEERING JUNE 2020

MRE 1101 ENGINEERING MATHEMATICS I

(*2013 Scheme*)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet]
Max. Marks: 14

INSTRUCTIONS

1. You have to be available in Google Meet on demand by the faculty.
2. You have to answer only one question.
3. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
4. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
5. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
6. You have to put the Question Number correctly.
7. After answering the question, you have to scan and upload the answer page.

MODULE - V

(Answer ***ANY ONE*** question)

V(1). (a) Prove that $[\bar{B}\ X\bar{C}, \bar{C}X\bar{A}, \bar{A}X\bar{B}] = [\bar{A}\bar{B}\bar{C}]^2$. (7)

(b) Find the unit vector perpendicular to each of the vectors $\bar{a} = 2\mathrm{i} - \mathrm{j} + \mathrm{k}$ and $\bar{b} = 3\mathrm{i} + 4\mathrm{j} - \mathrm{k}$ and obtain the sine of the angle between the vectors $\bar{a}\ and\ \bar{b}$. (7)

OR

V(2). (a) Prove that $\nabla r^n = n(n+1)r^{n-2}$. (7)

(b) Find the directional derivative of $xy^2 + yz^3$ at (2, –1, 1) in the direction of the vector i + 2j + 2k. (7)

***