University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

THEORY EXAMINATION – JULY 2021	
B.TECH - ELECTRONICS	**SEMESTER - IV**

TIME – 4 Hrs.

M.M. - 75

PAPER - BS-204

SUBJECT- HIGHER ENGINEERING MATHEMATICS

INSTRUCTIONS TO BE FOLLOWED

- **The candidates will be required to attempt All questions in Part-A and Part-B (Compulsory Sections). Attempt any four questions from Part-C selecting at least one from each unit.**
- **Allotted time for examination is 4 hours that includes time for downloading the question paper, writing answers, scanning of answer sheets and uploading the sheets on the Attendance Sheet Cum Answer Sheet Uploading google form.**
- **For all ECE Reappear students, they should join the Google Meet Link and WhatsApp Link for Section-B Students for appearing in the exam and should upload their sheets in the Attendance Sheet Cum Answer Sheet Uploading Google Form meant for ECE-B regular students.**
- **The PDF files should be saved as Roll No. and Subject Code.**
- **Maximum Page Limit should be 36 (Thirty Six) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the UIET Website.**
- **Over-attemptation should be avoided.**
- **Handwriting should be neat and clean and diagrams should be clear and contrasted.**
- **The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.**
- **While attempting the paper, the candidate will use blue/black pen only.**
- **Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.**
- **Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.**
- **Attempt parts A, B & C separately. Do not inter-mix them. Write neatly & mention the question number clearly.**

PART-A (15 Marks)

Q. No. – 1 Answer the following questions. **15x1=15**

(i)	**L** $(e^{at}coshbt)$**=** $\cdots$ **?**
(ii)	**L**$\left\{\int_0^t \int_0^t \int_0^t tsint\, dt\, dt\, dt\right\}$.
(iii)	**Solve using Laplace transformation** $\int_0^\infty e^{-2t}\, cos3t\, dt = \cdots$
(iv)	**If** $L^{-1}[\emptyset(s)] = f(t), then\ L^{-1}[e^{-as}\emptyset(s)] = \cdots$
(v)	**Solution of the PDE** $p^2 - q^2 = x - y$ **is ?**
(vi)	**Find the complementary function of the PDE** $\left(D^2 - D'^2\right) = e^{x-y}\sin(x+2y)$**.**
(vii)	**By eliminating** a **and** b **from** $z = a(x+y) + b$ **the PDE formed is …?**
(viii)	**The solution of** $p + q = z$ **is?**
(ix)	**The Newton Raphson algorithm for finding the cube root of N is…?**
(x)	**The iterative formula for finding the reciprocal of N is** $x_{n+1} = \cdots$
(xi)	**In Regula falsi method the first approximation is given by…?**
(xii)	**Simpson's 3/8th rule state that..?**
(xiii)	**Using forward differences, the formula for** $f'(a)$ **=…?**
(xiv)	**The expression for** $\left(\frac{dy}{dx}\right) at\ x = x_0$ **using backward differences is?**
(xv)	**Newton's divided difference formula state that…?**

PART-B (20 Marks)

<table>
<tr><td colspan="3">UNIT-I</td></tr>
<tr><td>2</td><td>Find the Laplace inverse of the function $log\left\{\frac{s+1}{(s+2)(s+3)}\right\}$.</td><td>5</td></tr>
<tr><td colspan="3">UNIT-II</td></tr>
<tr><td>3</td><td>Form the PDE by eliminating arbitrary functions $z = x^2 f(y) + y^2 g(x)$</td><td>5</td></tr>
<tr><td colspan="3">UNIT-III</td></tr>
<tr><td>4</td><td>Apply Lagrange's formula inversely to obtain a root of the equation f(x)=0, given that $f(30) = -30, f(34) = -13, f(38) = 3\ and\ f(42) = 18$</td><td>5</td></tr>
<tr><td colspan="3">UNIT-IV</td></tr>
<tr><td>5</td><td>The velocity v(km/min) of a moped which starts from rests, is given at fixed intervals of time t (min) as follows:
<table>
<tr><td>t</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td><td>12</td><td>14</td><td>16</td><td>18</td><td>20</td></tr>
<tr><td>y</td><td>10</td><td>18</td><td>25</td><td>29</td><td>32</td><td>20</td><td>11</td><td>5</td><td>2</td><td>0</td></tr>
</table></td><td>5</td></tr>
</table>

PART-C (40 Marks)

<table>
<tr><td colspan="3">UNIT-I</td></tr>
<tr><td>6</td><td>Using convolution theorem find $L^{-1}\{\frac{1}{(s-2)(s+2)^2}\}$</td><td>10</td></tr>
<tr><td>7</td><td>Using Laplace and Laplace inverse Transformation $\frac{d^2y}{dt^2}+5\frac{dy}{dt}+5y=e^{-t}\sin t$, where $y(0)=0\ and\ y'(0)=1$</td><td>10</td></tr>
<tr><td colspan="3">UNIT-II</td></tr>
<tr><td>8</td><td>Solve the PDE$(z^2-2yz-y^2)p+(xy+zx)q=xy-zx$</td><td>10</td></tr>
<tr><td>9</td><td>Find the solution of PDE $(D^2-DD')z=cos2y(sinx+cosx)$</td><td>10</td></tr>
<tr><td colspan="3">UNIT-III</td></tr>
<tr><td>10</td><td>The equation $2x=log_{10}x+7$ has a root between 3 and 4. Find this root, correct to three decimal places, by Regula-Falsi method</td><td>10</td></tr>
<tr><td>11</td><td>The table gives the distances in nautical miles of the visible horizon for the given heights in the earth's surface:
<table>
<tr><td>x= height</td><td>100</td><td>150</td><td>200</td><td>250</td><td>300</td><td>350</td><td>400</td></tr>
<tr><td>y=distance</td><td>10.63</td><td>13.03</td><td>15.04</td><td>16.81</td><td>18.42</td><td>19.90</td><td>21.27</td></tr>
</table>
Find the values of y when (i) x=218ft. (ii) 410 ft.</td><td>10</td></tr>
<tr><td colspan="3">UNIT-IV</td></tr>
<tr><td>12</td><td>Given that
<table>
<tr><td>x</td><td>1.0</td><td>1.1</td><td>1.2</td><td>1.3</td><td>1.4</td><td>1.5</td><td>1.6</td></tr>
<tr><td>Y</td><td>7.989</td><td>8.403</td><td>8.781</td><td>9.129</td><td>9.451</td><td>9.750</td><td>10.031</td></tr>
</table>
Find $\frac{dy}{dx}\ and\ \frac{d^2y}{dx^2}$ at (a) x=1.1 (b) x=1.6</td><td>10</td></tr>
<tr><td>13</td><td>Using Range-Kutta method of fourth order, solve $\frac{dy}{dx}=\frac{y^2-x^2}{y^2+x^2}\ with\ y(0)=1\ at\ 0.2$</td><td>10</td></tr>
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