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THIRD QUIZ A

Let $a, b, c, d \in \mathbb{R}$. Consider the PDE $(a\partial_x + b\partial_y)(c\partial_x + d\partial_y)u = 0$. If $u_{xy} = u_{yx}$ is assumed then, the above PDE is

- a). always Hyperbolic
- b). always parabolic
- c). never parabolic
- d). never elliptic.
- e). None of the above.

This is a long answer type question. You can either upload a file or type your answer below.

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A screenshot of the CKEditor toolbar. The top row contains icons for undo, redo, bold, italic, underline, strikethrough, subscript, superscript, and text color. The bottom row contains icons for bulleted list, numbered list, decrease indent, increase indent, link, unlink, and source. The toolbar is light gray with a white background for the icons.

Q.2 [7 Marks, Descriptive Question]

Consider the following equations:

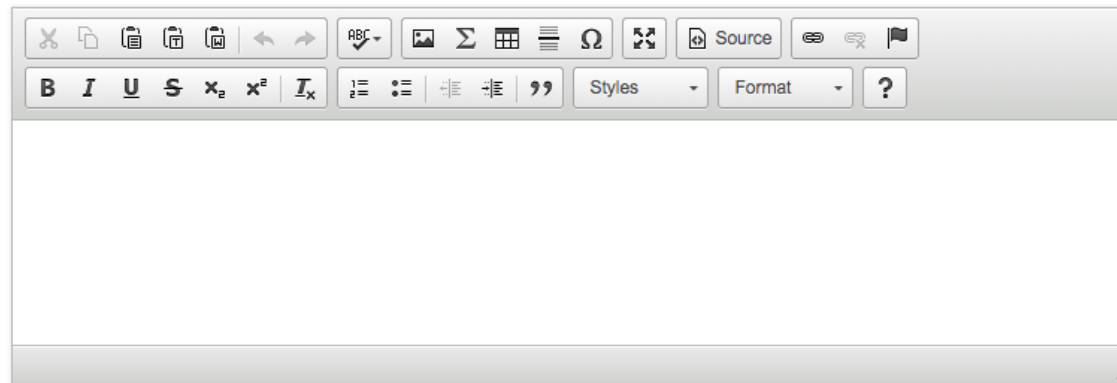
$$8u_{xx} + 2u_{xy} - 3u_{yy} = 0.$$

- a) Is the above equation Parabolic, Hyperbolic or Elliptic.
- b) Reduce it to its canonical form.

This is a long answer type question. You can either upload a file or type your answer below.

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A rich text editor interface with a toolbar at the top containing icons for undo, redo, bold, italic, underline, strikethrough, text color, background color, bulleted list, numbered list, link, unlink, and source code. Below the toolbar is a large, empty text area for typing the answer.

Q.3 [3 Marks, MCQ question]

Which of the following function are "**not**" harmonic

- a). $f(x) = ax + b$
- b) $f(x, y) = x^2 - y^2$
- c) $f(x, y) = \frac{\sin^2(xy)}{1+x^2+y^2}$
- d) none of the above.

This is a long answer type question. You can either upload a file or type your answer below.

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b

Q.5 [3 Marks, MCQ question]

Let $u(x, t)$ be the solution of the initial value problem

$$u_{tt} = u_{xx}, t > 0$$

$$u(x, 0) = x^3, \quad u_t(x, 0) = \sin x$$

Then $u(\pi, \pi)$ is

- a) $4\pi^3$
- b) 0
- c) π^3
- d) 4
- e). None of the above.

This is a long answer type question. You can either upload a file or type your answer below.

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or

A screenshot of the CKEditor toolbar. The top row contains icons for Cut, Copy, Paste, Undo, Redo, ABC (Text), Image, Sum, Table, Horizontal Line, Omega, and a Source button. The bottom row contains icons for Bold (B), Italic (I), Underline (U), Strikethrough (ABC), Subscript (x₂), Superscript (x²), and Text Color (I_x), followed by a list icon, a list icon, a list icon, a list icon, a quote icon, a Styles dropdown, a Normal dropdown, and a Help icon (?). Below the toolbar, the text 'a' is entered in the editor area.

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