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THIRD QUIZ A

Q.1 [3 Marks, MCQ question]

Let $a, b, c, d \in \mathbb{R}$. Consider the PDE $\left(a\partial_x + b\partial_y\right)\left(c\partial_x + d\partial_y\right)u = 0$. 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.

UPLOAD A FILE

or

d

div p

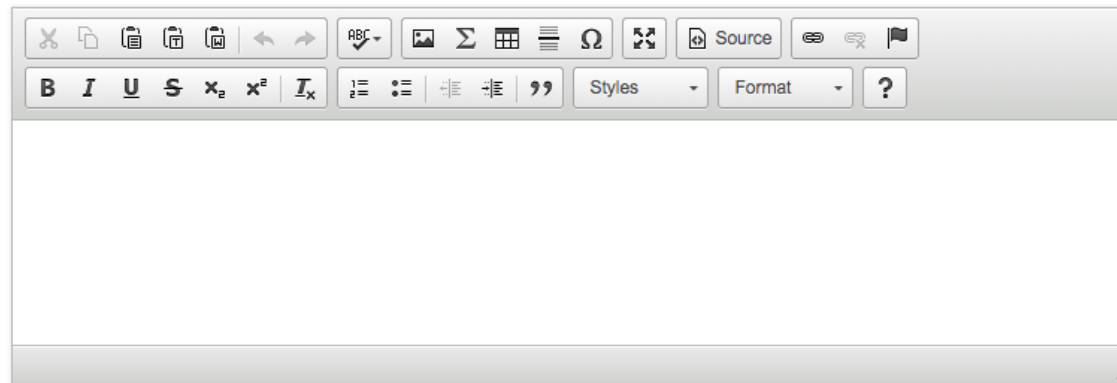**Q.2 [7 Marks, Descriptive Question]**

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 cannonical form.

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

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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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or

c

Q.4 [3 Marks, MCQ question]

Let u be the unique solution of

$$u_{tt} = u_{xx},\ x \in \mathbb{R}, t > 0,\ u(x, 0) = f(x), u_t(x, 0) = 0,\ x \in \mathbb{R}$$

where $f : \mathbb{R} \to \mathbb{R}$ satisfies the relations

$$f(x) = x(1 - x), \forall x \in [0, 1] \text{ and } f(x + 1) = f(x),\ \forall x \in \mathbb{R}.$$

Then $u(\frac{1}{2}, \frac{5}{4})$ is,

a) 1/8

b) 3/16

c) 1/16

d) 5/16

e) None of the above.

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

UPLOAD A FILE

or

b

Q.5 [3 Marks, MCQ question]

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

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

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

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.

UPLOAD A FILE

or

a

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