# 2010 Mathematics (1)

This pdf was generated from questions and answers contributed by members of the public to <a href="Christopher Lester">Christopher Lester</a>'s tripos/example-sheet solution exchange site <a href="http://cgl20.user.srcf.net/">http://cgl20.user.srcf.net/</a>. Nothing (other than raven authentication) prevents rubbish being uploaded, so this pdf comes with no warranty as to the correctness of the questions or answers contained. Visit the site, vote, and/or supply your own content if you don't like what you see here.

This pdf had url <a href="http://cgl20.user.srcf.net/camcourse/paperpdf/16?withSolutions=1">http://cgl20.user.srcf.net/camcourse/paperpdf/16?withSolutions=1</a>.

This pdf was creted on Thu, 25 Apr 2024 12:28:54 +0000.

#### Section A

### 1

No image has yet been uploaded for this question No soution has yet been submitted for this question.

## 2

No image has yet been uploaded for this question No soution has yet been submitted for this question.

## 3

No image has yet been uploaded for this question No soution has yet been submitted for this question.

# 4

No image has yet been uploaded for this question No soution has yet been submitted for this question.

### 5

No image has yet been uploaded for this question No soution has yet been submitted for this question.

## 6

No image has yet been uploaded for this question No soution has yet been submitted for this question.

#### 7

No image has yet been uploaded for this question No soution has yet been submitted for this question.

#### 8

No image has yet been uploaded for this question No soution has yet been submitted for this question.

#### 9

No image has yet been uploaded for this question No soution has yet been submitted for this question.

# 10

No image has yet been uploaded for this question No soution has yet been submitted for this question.

# **Section B**

### **11S**

No image has yet been uploaded for this question No soution has yet been submitted for this question.

## 12X

No image has yet been uploaded for this question No soution has yet been submitted for this question.

# 13Y

No image has yet been uploaded for this question No soution has yet been submitted for this question.

# 14Z

No image has yet been uploaded for this question No soution has yet been submitted for this question.

## **15S**

No image has yet been uploaded for this question No soution has yet been submitted for this question.

### 16T

No image has yet been uploaded for this question No soution has yet been submitted for this question.

### 17T

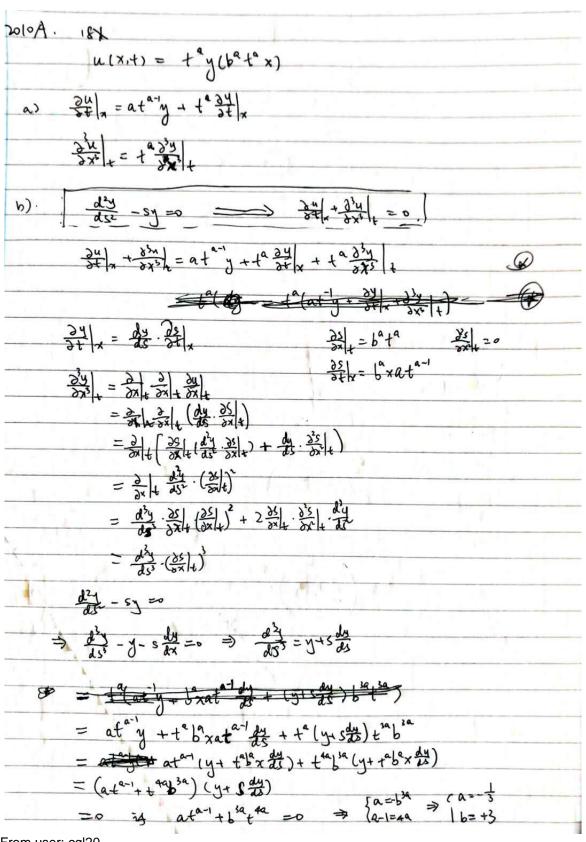
No image has yet been uploaded for this question No soution has yet been submitted for this question.

### 18X

No image has yet been uploaded for this question

## Solution(s):

From user: mz407



From user: cgl20

(a) (i) 
$$\frac{\partial u}{\partial t} = at^{a-1}y + ab^{a}t^{a-1}x y'$$

(ii)  $\frac{\partial^{2}u}{\partial x^{2}} = t^{a}(b^{a}t^{a})^{3}y'' = t^{aa}b^{3a}y'''$ 

(b) Now we are told to assume that  $y'' = sy$ .

This fact  $\Rightarrow y''' = sy + y$ 

$$\frac{\partial^{2}u}{\partial x^{2}} + \frac{\partial u}{\partial t} = t^{4a}b^{3a}(b^{2}t^{2}x y' + y) + at^{a-1}y + ab^{a}t^{a-1}x y'$$

$$= (t^{5a}b^{4a} + at^{a-1}b^{a})xxy' + (t^{4a}b^{3a} + at^{a-1})y$$

$$= (t^{4a}b^{3a} + at^{a-1})(b^{a}xy' + y)$$
For RHS to be equal to zero and independent of the could require  $(t^{4a}b^{3a} + at^{a-1} = 0 + t)$ 

$$\begin{cases} 4a = a-1 & (seme t powers) \\ b^{3a} = a & (ancettation) \end{cases} \end{cases} \Leftrightarrow \begin{cases} a = -t_{3}^{3} \\ b = 3 \end{cases} . \Leftrightarrow DED.$$

# 19Z\*

No image has yet been uploaded for this question No soution has yet been submitted for this question.

# 20Y\*

No image has yet been uploaded for this question No soution has yet been submitted for this question.