

Assignment 1

Distributed: September 19, 2012

Due to be handed in: **September 26 , 2012, by 3 pm**

You should attempt all questions, consisting of the problems (where the numbers refer to Griffiths, 3rd edition) and the short problem parts.

Problems: (in Griffiths)

- 1) Problem 1.49
- 2) Problem 1.44
- 3) Problem 1.55
- 4) Problem 2.3

Short problems:

- 5) Calculate the Laplacian of the function $T(x,y,z)$ where
$$T = \sin x e^{-2y} \cos 3z$$
- 6) A point P is located at a distance b on the z axis directly above the centre of a circle of radius b lying in the plane $z = 0$. What is the total solid angle subtended at P by the circle? [Hint: you may assume without proof the result for the solid angle of a regular cone given in the lecture notes].
- 7) The point P is now moved upwards to a new distance d from the centre of the circle. If the solid angle is one half of its previous value, calculate the ratio d/b .