UNIVERSITY OF SWAZILAND

FACULTY OF EDUCATION
EXAMINATION PAPER 2010

B. Ed. II

TITLE OF PAPER : Curriculum Studies in Physics

COURSE NUMBER: EDC 282

TIME ALLOWED Three (3) hours

INSTRUCTIONS

1. This paper contains five questions
2. Question 1 is COMPULSORY. You may then choose ANY THREE questions from questions 2, 3, 4, 5
3. Question 1 is 40 marks and questions 2-5are worth 20 marks each
4. Any piece of material or work which is not intended for marking purposes should be clearly CROSSED OUT
5. Ensure that responses to questions are NUMBERED CORRECTLY

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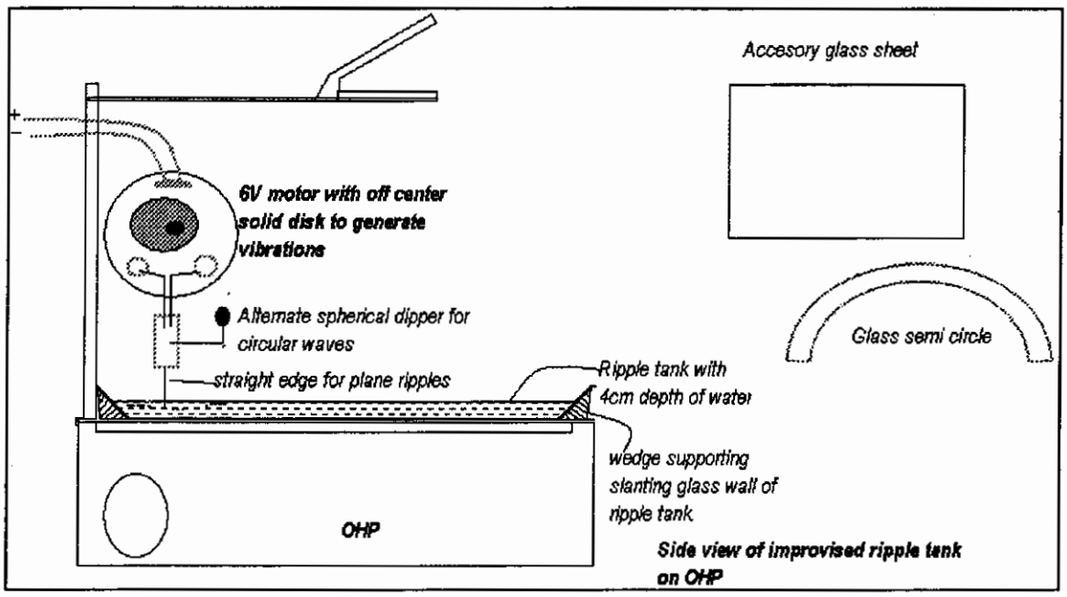
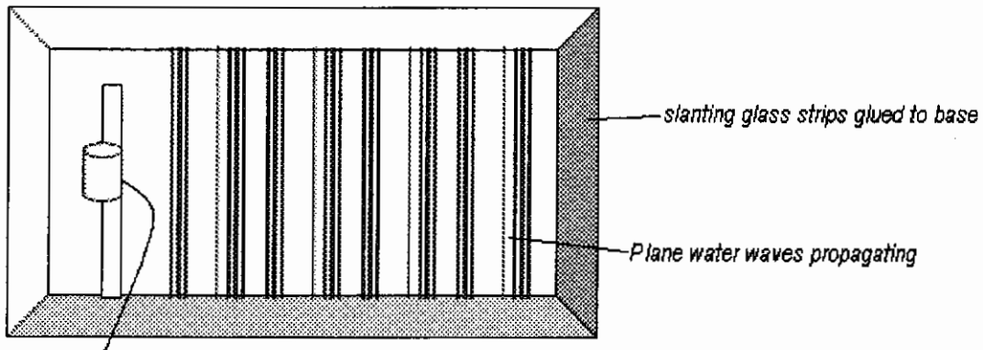
Question 1 40 marks

a) What is a misconception? Give two examples. [5]
b) What are the chief sources of misconceptions? [5]
c) How do you confront religious beliefs that children bring to school [5]
d) A Physics teacher devised a ripple tank for projection from an overhead projector. The tank consists of a flat clear glass panel, slanting glass sides bound together with water resistant glue. Ripples are propagated in a depth of 4cm of water. Wave accessories used consist of a glass sheet, and a smooth curved surface.

For each improvisation, outline

i. Four concepts or levels of ideas that can be developed
ii. Two practical weaknesses in the design
iii. Any two misconceptions that can arise from the improvised ripple tank. [25]





TOP VIEW OF PROJECTION RIPPLE TANK.

Question 2 [20 marks]

One of the critical aims of secondary school physics education is the given in the box below. How can each of the following methods be used to achieve this goal?

> 1. provide, through well designed studies of experimental and practical science, a worthwhile educational experience for all students, whether or not they go on to study science beyond this level and, in particular, to enable them to acquire sufficient understanding and knowledge
>
> 1.1 to become confident citizens in a technological world, to take or develop an informed interest in matters of scientific import;
>
> 1.2 to recognise the usefulness, and limitations, of scientific method and to appreciate its applicability in other disciplines and in everyday life;
>
> 1.3 to be suitably prepared for studies beyond the IGCSE level in pure sciences, in applied sciences or in science-dependent vocational courses.

a) A science fair [5]
b) Field trip to a thermal or hydro-electricity generator [5]
c) A term long project research on how to harness wind or solar energy [5]
d) A week long assignment to calculate the total amount of electrical energy used in the home. [5]

Question 3 **[20 marks]**

Students often believe that physics in the real world and in school science are not related. Use the following real world contexts to demonstrate physics principles to secondary school pupils.

a. Cooking is very quick in a pressure cooker [4]
b. Doors and windows in air conditioned rooms should be kept closed [4]
c. Water spray from a hose pipe in sunshine produces a rainbow [4]
d. Microwave heats food in but not the ceramic dish containing it [4]
e. Lightning flashes are seen several seconds before the sound of thunder. [4]

Question 4 **[20 marks]**

Critique the use of models in Physics education using the following perspectives:

i. Theoretical models [5]
ii. Analogies [5]
iii. Physical models [5]
iv. Working models [5]

Question 5 **[20 marks]**

Sample situations from the practices of Teacher A and Teacher B are outlined in the following table:

Situation	Teacher A	Teacher B
1. Using Form 1 textbook, 'Water water everywhere'	Pupils read paragraphs aloud, in turn.	Pupils discuss water conservation ideas, water bill reading and costing.
2. Pupil asks, "Sir, does water in a dam boil before evaporation?"	'Eh eh, heat from the sun and the moon causes evaporation to happen at all times'	'Evaporation takes place at all temperatures at all times of the day'
3. Perfume sprayed in one corner of classroom	'Soon you will see the effect of diffusion of the smell'	'In what ways can perfume travel to our noses?'
4. Is Pluto a planet in the solar system	'Yes, Pluto is the farthest planet, it very small'	According to new developments let's find out on the internet.

For each situation, make a critical comparison of the practices of teachers A and B. [20]