UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME	:	**BACHELOR OF SCIENCE IN HOME ECONOMICS [FOOD SCIENCE AND TECHNOLOGY OPTION] YEAR V**
COURSE CODE	:	**FST 513**
TITLE OF PAPER	:	**FLUID MECHANICS**
TIME ALLOWED	:	**TWO (2) HOURS**
INSTRUCTIONS	:	**ANSWER QUESTION ONE (1) AND ANY OTHER (2) QUESTIONS**

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QUESTION 1 [COMPULSORY]

a) Discuss the difference in behaviour between a solid and fluid when shear force is applied.

[5 marks]

b) Fluids are classified into liquids and gases; explain the behaviour of liquids and gases when filled into a container.

[5 marks]

c) Explain the terms laminar and turbulent flow, and using a diagram explain the velocity distribution in each type.

[15 marks]

d) A batching tank is 2m in diameter. It is to be filled with a liquid food to a uniform depth of 1.5 m by means of a 20mm diameter pipe. The velocity of the liquid food in the pipe is 0.14m/second. Determine the time required to fill the tank.

[15 marks]
[Total = 40 marks]

QUESTION 2

a) Discuss wave propagation through incompressible and compressible media.
[10 marks]

b) Discuss subsonic and supersonic flow of compressible media. **[10 marks]**

c) Explain the difference between pumps and turbines. **[10 marks]**
[Total = 30 marks]

QUESTION 3

a) Discuss the basic operation principle of the following turbo machines and their use in the food industry.

i. Centrifugal pumps
ii. Compressors
iii. Fans and blowers
iv. Turbines

[20 marks]

b) Distinguish between radial and axial flow machines. **[10 marks]**

[Total = 30 marks]

QUESTION 4

a) Discuss one type of instrument for measuring each of the following properties of a fluid.

i. Static Pressure
ii. Flow rate in an open channel
iii. Flow rate in a pipe
iv. Viscosity of a fluid

[20 marks]

b) Explain the importance of the Reynolds Number of fluids and write the equation for calculating the Reynolds Number

[10 marks]

[Total = 30 marks]