

# TECHNICAL UNIVERSITY OF MOMBASA

FACULTY	<b>OF PURE</b>	AND	HEALTH	SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR BACHELOR IN INDUSTRIAL MICROBIOLOGY AND BIOTECHNOLOGY

**AAB 4303: PETROLEUM GEOMICRBIOLOGY (PAPER 1)** 

END OF SEMESTER EXAMINATION: APRIL 2016 SERIES

TIME 2 HOURS

**DATE** 

## **INSTRUCTIONS TO CANDIDATES**

You should have the following for this examination

-Answer Booklet, examination pass and student ID

THIS PAPER CONSISTS OF FIVE QUESTIONS. ATTEMPTQUESTION ONE
(Compulsory) AND ANY OTHER TWO QUESTIONS.

### Do not write on the question paper.

#### **QUESTION ONE**

a)(i) Describe the processes that lead to the formation of water mass (8 marks)

(ii) Describe major branches of oceanography

4mks

(b)(i) Define the term Micropaleontology

1 mark

(ii) Describe the morphology of Calcareous foraminifera microfossils	5 marks
(iii) Explain biogenetic origin of petroleum	7 marks
(C) (i) Identify any three bacterial strains capable degrading petroleum products	3 mark
(ii) State the importance of metallomonas microorganisms in the environment	2 marks
QUESTION TWO  (a) (i) Explain why bioremediation is relevant tool for rehabilitation of petroleum	
hydrocarbon contaminated environment	6 marks
(ii) Explain how metallomonas bacteria are capable of corroding metals (b)(i)Describe characteristics of petroleum reservoir 7marks	5 marks
(ii)Distinguish between <i>insitu</i> and <i>exsitu</i> bioremediation methods <b>QUESTION THREE</b>	2 marks

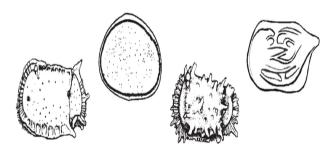
(a)(i) State any cause of acidification in the oceans

1 mark

### Anthropogenic carbon dioxide (CO2) emissions into the atmosphere.

(ii) Identify the microfossils shown below and state their significance in geology

4 marks



(ii)Disuss Palynomorph microfossils' structure and where they are commonly found 6marks

(b)(i) Explain importance of Pelagic and Benthic regions of the ocean

2 marks

(ii) Describe lentic hydrobiology

5marks

(iii) Distinguish between biosphere and lithosphere

2 marks

### **QUESTION FOUR**

(a)(i) Explain the process of primary oil recovery during petroleum exploration

7 marks

(ii)Discuss the biological methods of controlling petroleum pollution

8 maks

(b) (i) Identify any three fungi genera used in bioremediation of petroleum po marks	ollutants 3
(ii)Name any two gases which were abundant in the early the development of <u>Ear</u> across geologic time 2 marks	th'satmosphere
QUESTION FIVE	
(a)(i) Explain various sources of petroleum pollution	8marks
(ii) Other than bacteria and fungi describe any other organisms that are capable of degradation	Exenobiotic Smarks
(b)(i) State the role of hydrocarbonoclastic microorganisms in the environment	2 marks
(ii) Name the enzyme that introduces oxygen into hydrocarbon when degradation aerobic condition	occurs in 1 mark
(iii)Explain importance of biostratigraphy in petroleum exploration	3 marks