S475

**SUBSIDIARY MATHEMATICS**

JULY/AUGUST 2016

2HRS40 MIN

WESTERN JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education

**SUBSIDIARY MATHEMATICS**

2HOURS 40 MINUTES

**INSTRUCTIONS TO CANDIDATES:**

* Attempt all the **eight** questions in section **A** and any **four** questions in section **B.**
* Mathematical tables with a list of formulae and squared papers are provided.
* Silent, non programmable scientific calculators may be used.
* In numerical work take g to be 9.8 ms-2

**SECTION A**

1. Express 2 + 5 in the form a+bc

State the values of a, b, and c **5mks**

2.The roots of the equation 2x2 + 4x - 6 = 0 are and . Find the equation whose;and **. 5mks**

3.If is reflex and is a cute and that tan = and *Cos* ,

Evaluate without using tables or calculators **5mks**

4.The gradient function of a curve, is 3x2 + 2, find the equation of the curve if it

passes through (2, 0) **5mks**

5. The table below shows marks obtained by a group of students of a certain school in economics examinations for term I and II in 2010

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Term 1 | 53 | 74 | 48 | 71 | 74 | 60 | 66 | 60 |
| TermII | 41 | 50 | 44 | 38 | 41 | 44 | 48 | 45 |

(a). Calculate a rank Correlation for the data **4mks**

(b). What conclusion can you draw from your results in (a) above? **1mk**

6. A random variable X, of a discrete probability density function is given by

ƒ(x) = kx , x = 1, 2,3,4,5

0 otherwise

(a). Find the value of constant k **2mks**

(b).Find E(X) **3mks**

7. Forces of 3N, 4N and 6N act on a particle in the directions 300, 900 and 1500

respectively. Find the magnitude of the resultant force. **5mks**

8. Forces of (10*i* +2*j*)N and (*ai* + *bj*)N act on a body of mass 500g causing it to ~ ~ ~ ~

accelerate at (24*i* + 3*j*) ms-2. Find the constant *a* and *b* **5mks**

~ ~

**SECTION B (60MARKS)**

9. (a) Differentiate (x + 5) 2 with respect to x. **4mks**

(b). (i) Find the nature of the turning point of the curve y = 4*x* - *x*2 **4mks**

(ii) Find the intercepts of the curve y = 4*x* - *x*2, hence sketch the curve **3mks**

(iii) Find the area enclosed by the curve y = 4*x* –*x*2 and *x*- axis from x = -2

to x = 0 **4mks**

10. The heights in centimeters of 100 recruits who reported for a recruitment exercise

were recorded as follows.

|  |  |
| --- | --- |
| Heights (cm) | Number |
| 148 - 152 | 6 |
| 153 - 157 | 11 |
| 158 - 162 | 17 |
| 163 - 167 | 28 |
| 168 - 172 | 20 |
| 173 - 177 | 15 |
| 178 - 182 | 3 |

(a). Draw a histogram to represent the heights of the recruits and estimate the modal height.

(b). Using a working mean of 165 cm, calculate

(i). Mean

(ii). Standard deviation **15mks**

11. (a). A cyclist accelerates uniformly from rest at a rate of 2ms-2 for 20s. It moves

with a constant velocity for 10s before coming to rest in 5 seconds. Sketch a

velocity time graph and find the total distance covered. **10mks**

(b). Forces of 2, 6N and 4N act on a particle. Find the magnitude and direction of the resultant force. **5mks**

6N

2

600

450

30o

4N

12. (a). There are ten objective questions each with four possible alternatives, out of

which only one is a correct answer. If an ignorant student attempts all the

questions by mere guess work, find the probability that

(i). He gets exactly 4 correct answers **3mks**

(ii). He gets between 4 and 7 correct answers **6mks**

(b). The marks obtained by some selected candidates in mock examinations were

normally distributed with mean 50% and standard deviation of 10%. Find the probability that if a student is picked at random from the group that did the

examination, he obtained between 40% and 55% **6mks**

13. (a) .Without using tables or calculators, find the values of the following

(i). tan 2100  **2mks**

(ii). Cos 1350  **2mks**

(iii). Sin 3000 **2mks**

(b). Solve the equation 3 - 6 sin = 0 for 00 1800 **5mks**

(c). If sin A= and A is acute angle, find the value of tanA **4mks**

14. (a). A body of mass 5kg resting on a rough horizontal table is connected by a light

inextensible string, passing over a smooth fixed pulley at the edge of the table, to a body of mass 8kg hanging freely. If the coefficient of friction between the mass and the table is 0.4, find the

(i). Common acceleration of the bodies

(ii). Tension in the string  **9mks**

(b). A body of mass 10kg is resting on a rough horizontal plane, the coefficient of

friction being 0.4, find the minimum horizontal force acting on the body that

would move it. **6mks**

**END**