



کراچی یونیورسٹی
University of Karachi
Department of Mathematics
MATH 609 • Biomathematics I

Time Allowed: 3 hours • Maximum Marks: 80 • Date: Friday, June 14, 2013 • Paper Format: A

Student's Name _____ (in CAPITAL LETTERS using a "marker")

Each part of **Question 1** is of 4 marks. **Questions 2-7** are of 10 marks each. Note down the time spent on solving each part of question and time spent on revision by making the following "Time Chart" on the answerbook front page (2 marks). Time spent on revision must be at least 10% of the total time.

Question No.	1a	1b	1c	1d	2	3	4	5	6	7	Revision
Time (minutes)											

a) DO NOT TURN PAPER AROUND unless the invigilator says: Start now

b) This is a closed-book examination. Deposit all BOOKS, NOTES, MOBILE PHONES (switched off), DIGITAL DIARIES and LAPTOPS in the designated area. Remove everything from your desk, except markers, pens, pencils, stapler and calculator.

c) If you want to use a calculator, **it must bear a "sticker"** displaying your NAME and your SEAT NUMBER, large enough so that it is visible from a distance of 5 meters. **Absolutely, NO sharing of calculators.**

d) Use your own material. **Nothing can be borrowed from or given to** a friend.

e) The papers may be of different formats. Therefore, work on your own **without consulting anyone** (We have a record of your seating arrangement).

f) Write your "NAME" on all pages of **your question paper** (5 marks shall be deducted for failing to comply) [NOTHING ELSE SHOULD BE WRITTEN ON THE QUESTION PAPER] and "PAPER FORMAT" on the front page of **your answerbook** (the upper-right-hand corner) and **the Yellow Sheet** using a "marker". Start your work from **Page 2** of your answerbook. The only thing that could be written on the front page is the "Time Chart" (see above) and the "Honor Statement" (see below).

g) The following statement must be copied on the front page of your answerbook and signed (2 marks): "My signatures, below, testify that I am the person, whose name and photograph appear on the Admit Card. Upon my honor, I declare that the following work is my own, completed without giving or receiving unacknowledged help, without copying, or the use of any unfair means." Signatures _____

h) This paper contains TWO PAGES (this page and the back page). On invigilator's signal (Start now) turn the paper around, check if you have the back page printed, correctly. Last line of the second

page reads: <END>. Start working on the paper, immediately.

i) Put your pens down and your papers turned (so that this page is facing you) and the FRONT PAGE of your answerbook should be facing you as soon as you hear "ALL PENS DOWN". Failure to do as directed shall result in "deduction of 5 marks" from your score.

j) If you use extra copies, it is "your responsibility" to write YOUR NAME, COPY NUMBER and all OTHER INFORMATION on each copy used. All the extra copies must be stapled with the main copy, before turning in your paper (you may wish to bring in a stapler with you for this purpose).

k) If you have a question of "Fill in the blanks" in your paper you must write the complete sentence with the filled word underlined.

l) Nobody is allowed to leave the examination hall, **for whatsoever reason**, once the examination has started. Bring your own DRINKING WATER.

m) Students are not allowed to LEAVE THEIR SEATS or STAND UP during the examination. If you have a query, "raise your hand" and someone will help you.

n) All work, including rough work, must be on the official answerbook. No extra sheet may be used.

o) Students are *not* allowed to use RED anywhere. All work (except figures) must be in pen or ballpoint.

p) The result shall be displayed on my homepage on after all the lab reports are in. DO NOT contact the Course Supervisor. Students are not permitted to see the answerbooks.

q) Anyone found cheating in the examination should be facing disciplinary action, which may result in **EXPULSION** or **SUSPENSION** for 2 or more years as per University of Karachi rules. **Absolutely, no conversation among students. DON'T TURN THE PAPER, YET. Wait for "signal" from the invigilator.**

Student's Name _____ (in CAPITAL LETTERS using a "marker")

- 1-a) A child's age was computed to be 7.26 years on 2012-07-15 (SGPP-KHI-20110614-01/01). What could be her date of birth in fractional form? Compute the date of birth in the format YYYY-MM-DD.
- 1-b) Define accuracy and precision of measurements. How is reproducibility of measurements different from repeatability?
- 1-c) According to Karlberg's model of linear growth, infancy period begins at the moment of birth. (*TRUE or FALSE. If FALSE, then write CORRECT STATEMENT*). A child, whose percentile of mass is greater than that of height, is said to be _____ (*tall-for-age, wasted, stunted, obese*). In human biology the equivalent of kinematics is _____ (*anthrodynamics, kinesiology, biomechanics*). _____ axis is perpendicular to the transverse plane passing through the body from top to bottom. (*transverse, longitudinal, anteroposterior*).
- 1-d) What is box-interpolation? How is it different from linear interpolation? What are the two routes followed for calculations in the context of computing growth-and-obesity profiles of children? Which route is preferable?
- 2) Compute the following for a female child (SGPP-KHI-20110614-01/01): (i) mid-parental height, (ii) percentile of mid-parental height, with the following parameters given: Height of the child = 119.36 cm, height of her father = 172.01 cm, height of her mother = 162.94 cm; see Q-3 for height and weight data.
- 3) Compute the obesity profile of the following female (SGPP-KHI-20110614-01) [height = 162.94 cm; gross mass = 61.63 kg; clothing correction = 0.30 kg, dress code = 2/2, date of birth = 1980-02-15, date of check up = 2012-07-15 using the height and weight data:

Percentiles	3	5	10	25	50	75	90	95	97
Height (cm)	151.50	152.50	154.75	159.00	163.50	167.50	172.50	174.00	175.25
Mass (kg)	45.25	46.50	48.25	52.25	58.25	66.00	75.25	82.50	88.75

- 4) Write short notes on any TWO of the following:
- Nutrition and type of nutrients
 - BMI and its shortcomings
 - Hippocratic oath
- 5) What is the ICP model? Who presented it and when? Human biology supports mathematics behind the ICP model. Give arguments in favor of this statement.
- 6) Write down the steps in measuring MUAC of a child. List the sources of error and sources of hazard/injury in the measurement of MUAC.
- 7) Differentiate between anthropometry and anthromathematics? Give reasons why anthropometric measurements are widely used in clinical studies and medical research for the assessment of health status of individuals as well as that of populations.

Web address of this document: http://www.ngds-ku.org/M609-10/Exams609-10/609-13_Paper.pdf
(to be uploaded 12 hours after the conclusion of examination)

Exam paper solution: **First Class of MATH 610: Biomathematics II**