



**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Science**  
**Fundamentals of Laboratory Management**  
**HD2213**

**2nd year 2nd semester –Batch 01**

**Repeat End Semester Examination- SEQ Examination**

**Duration 2 hrs**

**INDEX NUMBER:**

**Date** : 13.02.2023  
**Time** : 09.00 am – 11.00 am (2 hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of FOUR questions.
- Answer ALL questions.
- You should write legibly in black or blue ink
- You are not allowed to take out the examination papers.

- Question 01** (100 marks)
- 1.1 State three types of laboratories (15 marks)
- 1.2 State five topics that are contained in a standard operating procedure. (25 marks)
- 1.3 State four types of laboratory waste. (20 marks)
- 1.4 Briefly describe two methods of disposing of laboratory chemical waste. (20 marks)
- 1.5 State two things that should be considered when considering the safety of a laboratory. (20 marks)

**Question 02** (100 marks)

- 2.1 How many grams of Sodium chloride (NaCl) should you use to make 37 ml of a  
 1.0 moldm<sup>-3</sup> solution? (Na – 23 g/mol, Cl - 35.5 g/mol) (20 marks)
- 2.2 How do you make a 1:300 dilution of a bacillus spore sample? (20 marks)
- 2.3 Find the dilution factor if 2.5 ml of a stock solution is combined with 7.5 ml of water. (20 marks)
- 2.4 How would you prepare 3% (W/V) NaCl solution in 100ml of water  
 (w/v = weight (of a solute) per final solution volume) (20 marks)
- 2.5 A rainwater sample has a H<sup>+</sup> concentration of  $1 \times 10^{-5}$ . Find the pH of the rainwater.  
 $\text{pH} = -\log ([\text{H}^+])$  (20 marks)

**Question 03** (100 marks)

- 3.1 Define record retention (10 marks)
- 3.2 What are the elements of a patient order form for a test? (20 marks)
- 3.3 Describe 3 components of analytical phase to monitor for ensuring the reliability of results. (30 marks)
- 3.4 State the features of Standard Operating Procedures. (10 marks)
- 3.5 Describe the patient's rights which covered by Patient's Bill of Rights. (30 marks)

**Question 04** (100 marks)

- 4.1 What is a Laboratory Information Management System (LIMS)? (10 marks)
- 4.2 State the advantages of LIMS within a clinical laboratory. (10 marks)
- 4.3 Describe different sections of laboratory report of a test. (30 marks)
- 4.4 Mention the cost-effective measures which taken by clinical laboratory management. (20 marks)
- 4.5 Draw a Microbiology Laboratory floor plan and by referring to your plan state how to prevent contamination and provide protection to the laboratory worker. (30 marks)



Faculty of Health Sciences

HIGHER DIPLOMA IN BIOMEDICAL SCIENCES

HD2233

Pathology of Diseases

2<sup>nd</sup> year 2<sup>nd</sup> Semester

End Semester SEQ Examination-Resit

INDEX NUMBER: .....

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Date	: 15 of February 2023
Time	: 9.00 a.m. – 12.00 p.m. (Three hours)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

- Question 1** (100 marks)
- 1.1 Name 4 types of Cystic Diseases of the Kidneys (20 marks)
  - 1.2 Write a short note on Chronic Kidney Disease (30 marks)
  - 1.3 List the clinical signs and symptoms of Eclampsia (20 marks)
  - 1.4 Define the following disease conditions.
    - 1.4.1 Vaginal candidiasis (15 marks)
    - 1.4.2 Hypospadias (15 marks)
- Question 2** (100 marks)
- 2.1 Write short Notes of the followings
    - 2.1.1 Talipes Equinovarus (clubbed foot) (25 marks)
    - 2.1.2 Gout (25 marks)
    - 2.1.3 Cushing's disease (25 marks)
    - 2.1.4 Grave's disease (25 marks)
- Question 3** (100 marks)
- Briefly describe the followings.
- 3.1 Giant cells in chronic inflammation (25 marks)
  - 3.2 Coagulative necrosis (25 marks)
  - 3.3 Caseous necrosis (25 marks)
  - 3.4 Apoptosis (25 marks)
- Question 4** (100 marks)
- 4.1 Briefly describe the pathological changes in following stages of lobar pneumonia.
    - 4.1.1 Congestion (20 marks)
    - 4.1.2 Red Hepatisation (20 marks)
    - 4.1.3 Gray Hepatisation. (20 marks)
    - 4.1.4 Stage of Resolution (20 marks)
  - 4.2 Briefly describe on emphysema (20 marks)
- Question 5** (100 marks)
- 5.1 List cardinal signs of inflammation. (10 marks)
  - 5.2 Compare followings.
    - 5.2.1 acute inflammation and chronic inflammation (30 marks)
    - 5.2.2 Dry gangrene and wet gangrene. (30 marks)
    - 5.2.3 Regeneration & Repair. (30 marks)
- Question 6** (100 marks)
- Write short notes on followings.
- 6.1 Hypertrophy (25 marks)
  - 6.2 Hyperplasia (25 marks)
  - 6.3 Atrophy (25 marks)
  - 6.4 Metaplasia (25 marks)





**Faculty of Health Sciences**

**Higher Diploma in Biomedical Science**

**HD 2243 – Biostatistics and Bioinformatics**

**2<sup>nd</sup> year 2<sup>nd</sup> semester – Batch 1**

**End Semester SEQ Examination**

**INDEX NUMBER:** .....

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**Date** : 23<sup>th</sup> December 2022

**Time** : 9.00 a.m. to 12.00 p.m.

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write answers in lined papers legibly in black or blue ink.
- You are not allowed to take out the examination papers.

**Question 01****(100 Marks)**

Assume that a research student wanted to find out whether the current crisis in Sri Lanka has significantly influenced on malnourishment of the children younger than 5 years. He sampled 20 children from a selected MOH area and the weight data observed were as follows.

10, 18, 8, 12, 11, 17, 12, 15, 13, 9, 10, 14, 12, 9, 9, 14, 16, 12, 15, 11

A statistical analysis performed has analyzed the following for the data set.

Mean=12.35; Median= 12; Mode=12; Standard deviation= 2.852; Variance= 8.134; Skewness=0.24

- 1.1. Estimate the population mean with 95% confidence Intervals. (30 marks)
- 1.2. What percentage of data values are actually within  $\pm 1$  and within  $\pm 2$  standard deviation of the mean. (50 marks)
- 1.3. Comment on distribution of data considering the skewness. (20 marks)

**Question 02****(100 Marks)**

A biomedical scientist wanted to identify the bacteria species in a water sample taken from a pond. Therefore he plated the water samples taken from different sampling sites on Nutrient Agar. After 24 hours of incubation, the number of Colony Forming Units (CFU)/ mL, that he observed are as follows:

7, 16, 121, 51, 101, 81, 1, 16, 9, 11, 16

- 2.1. Find the mean, mode, median of this data. (30 marks)
- 2.2. Calculate the variance and standard deviation. (50 marks)
- 2.3. State the characteristic features of a normal distribution (20 marks)

**Question 03****(100 Marks)**

- 3.1. What does it mean by "Research Hypothesis"? (10 marks)
- 3.2. List five characteristics of a good hypothesis. (20 marks)
- 3.3. Mention the difference between null and alternative hypothesis. (20 marks)
- 3.4. State the null and alternative hypothesis for the following research problem.

Obesity is a major health problem in Sri Lanka. A researcher is conducting research to show that people may be able to lose more weight on a low carbohydrate diet than on a low-fat diet.

Research Problem: Does the data suggest that, people are able to lose more weight on a low carbohydrate diet than on a low-fat diet on average? (50 marks)

**Question 04****(100 Marks)**

- 4.1. What is "Data"? (10 marks)
- 4.2. Compare the data types of discrete and continuous data. (20 marks)
- 4.3. Order the following data types according to their statistical importance.  
Nominal, ordinal, ratio and interval (20 marks)
- 4.4. List the two examples for each of the above-mentioned data types. (50 marks)

**Question 05****(100 Marks)**

A university is assessing the performance of the students based on the semester end results for the subjects of Biology, Chemistry and Physics. The instructor has noticed that the students who are having higher attendance in Biology are more likely to perform well in other two subjects.

The instructor requires to check whether that there is an effect from the attendance of Biology to the results. The ANOVA table of the statistical analysis is mentioned below.

Source	SS	df	MS	F
Between	1900	2	?	?
Within	3355	21	?	
Total	5255	23		

- 5.1. Find the values of Mean Square (MS). (40 marks)
- 5.2. Calculate the F value. (20 marks)
- 5.3. Mention the critical value at the significance level of 0.05. (20 marks)
- 5.4. State the conclusion and the decision of the test. (20 marks)

**Question 06****(100 Marks)**

- 6.1. What are the common data formats used in the biological databases? (10 marks)
- 6.2. State the difference between the FASTA format and PLAIN TEXT format. (20 marks)
- 6.3. List the information appear in the NCBI GENBANK format. (30 marks)
- 6.4. Mention the uses of regression analysis in statistics. (40 marks)



**Faculty of Health Sciences**  
**Higher Diploma in Biomedical Science**  
**HD 2243 – Biostatistics and Bioinformatics**  
**2<sup>nd</sup> year 2<sup>nd</sup> semester – Batch 1**  
**Assignment**

**INDEX NUMBER:**

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<b>Date</b>	<b>:</b>	<b>23<sup>th</sup> December 2022</b>
<b>Time</b>	<b>:</b>	<b>1:30 p.m. to 2:30 p.m.</b>

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **TWO** questions.
- Answer **ALL** questions.
- You should write answers in lined papers legibly in black or blue ink.
- You are not allowed to take out the examination papers.



Question 01

(100 Marks)

The figure mentioned below are the output from the biological databases.

A.

```
Escherichia coli O25b:H4 chromosome, complete genome
GenBank: CP015085.1
FASTA Graphics
LOCUS       CP015085                5289898 bp    DNA     circular BCT 15-JUN-2016
DEFINITION  Escherichia coli O25b:H4 chromosome, complete sequence.
ACCESSION   CP015085
VERSION     CP015085.1
DBLINK      BioProject: PRJNA316859
            BioSample: SAMN04605558
KEYWORDS    .
SOURCE      Escherichia coli O25b:H4
  ORGANISM  Escherichia coli O25b:H4
            Bacteria; Proteobacteria; Gammaproteobacteria; Enterobacterales;
            Enterobacteriaceae; Escherichia.
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B.

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ID  A00145; SV 1; linear; unassigned RNA; PAT; MAM; 678 BP.
XX
AC  A00145;
XX
DT  22-MAR-1993 (Rel. 35, Created)
DT  14-APR-2005 (Rel. 83, Last updated, Version 3)
XX
DE  B.taurus BoIFN-alpha A mRNA
XX
KW  interferon alpha.
XX
OS  Bos taurus (cattle)
OC  Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia;
OC  Eutheria; Laurasiatheria; Cetartiodactyla; Ruminantia; Pecora; Bovidae;
OC  Bovinae; Bos.
XX
RN  [1]
RP  1-678
RA  ;
RT  ;
RL  Patent number GB2157697-A/1, 30-OCT-1985.
XX
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1.1.Mention the common features of the above-mentioned flat file output.

1.2.State the database which would provide the following result.

A-.....

B-.....