



PAST PAPERS

<i>Faculty</i>	<i>Department / Section/Division</i>
<i>Not Applicable</i>	<i>Learning Resource Centre</i>

Past Papers

Faculty of health science

**Bachelor of Science honours in Biomedical Sciences**

**Year 3 – Semester II**

<i>Document Control &amp; Approving Authority</i>	<i>Senior Director – Quality Management &amp; Administration</i>
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**CINEC**  
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**Faculty of Health Sciences**  
**Bachelor of Science (Honours) in Biomedical Sciences/ Bachelor of Science**  
**(Honours) in Industrial Pharmaceutical Sciences/ Bachelor of Science**  
**(Honours) in cosmeceutical Sciences**

**Ethics, Research Methodology and Statistics**  
**BMS/IPS/CS 3244**

**3<sup>rd</sup> Year 2<sup>nd</sup> Semester**  
**Batch 04**

**End Semester SEQ Examination**

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**Date: 13<sup>th</sup> of September 2023**

**Time: 09.00 am – 12.00 pm (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
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**Question 01** **(100 Marks)**

- 1.1. What is “sample”? (10 marks)
- 1.2. Compare the qualitative and quantitative data. (20 marks)
- 1.3. Write two examples for each data type mentioned below.  
Nominal, ordinal, ratio and interval (30 marks)
- 1.4. Briefly explain two probability sampling methods.. (40 marks)

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

- 2.1. Comment on the analysis of following SPSS output with the developed hypothesis for the test. (30 marks)

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
v	.231	5	.200*	.881	5	.314

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

2.2. A Biomedical scientist expected to do a toxicity analysis experiment using fish as trial organisms with a drug to be tested. He tested the mortality percentage of the fish after 24 hours of exposure with relevant to different concentrations of test drug in  $\mu\text{g/L}$ . A linear regression analysis was run from SPSS software package, for a collected dataset.

2.2.1. Define the dependent and independent variables. (20 marks)

2.2.2. Comment on the following analysis results of regression analysis. (50 marks)

### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.942 <sup>a</sup>	.888	.877	5.33791

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	47.333	3.774		12.540	.000
	concen_drug	.613	.069	.942	8.900	.000

### Question 03

(100 Marks)

3.1. A lecturer wanted to compare the scores for the module "Ethics, Research Methodology and Statistics" in two batches of CINEC students to analyze whether the mean score in two batches are significantly different or not.

3.1.1. What is the statistical test that she should perform to analyze the results ? (20 marks)

3.1.2. Construct the hypotheses for the test that you mentioned in 3.1.1. (20 marks)

3.1.3. If she got a p value of 0.065 by performing the test that you mentioned in 3.1.1; what should be her conclusion on marks of two batches of students ? (20 marks)

3.2. State the **ONE** research ethic per each of following.

3.2.1. When conducting a drug testing with wistar rats

3.2.2. When publishing a manuscript

3.2.3. When giving authorships for a final research paper

3.2.4. When reviewing a manuscript as a reviewer

(40 marks)



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

4.1. A university is analyzing the performance of the students, based on the duration of the study for the module of statistics. The three groups were prepared based on the time spent on studying daily; low (Less than 1 hour), middle (less than 5 hours) and high (less than 12 hours). University is required to check whether category high perform well during the examination.

Apply 5% confidence interval.

Category	Low	Middle	High
Sample size	7	9	8
Mean	75.71	75.71	75.71
Standard Deviation	17.63	17.63	17.63

4.1.1. Mention the null and alternative hypothesis. (20 marks)

4.1.2. Complete the following table based on the provided information and Find the F value. (60 marks)

Source	SS	df	MS	F
Between	1902			
Within				
Total	5288			

4.1.3. State the conclusion. (20 marks)

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

5.1. What are the steps of scientific method? (20 marks)

5.2. Mention FRIENDS framework on developing a good research topic. (20 marks)

5.3. List five characteristics of a good hypotheses. (20 marks)

5.4. A researcher is conducting an experiment to find whether a plant extract A has better antimicrobial property over the commercially available soap (B). Write the null and alternative hypothesis for the above research question? (40 marks)

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

6.1. State the basic 3 types of Epidemiological study designs (30 marks)

6.2. Briefly describe the following diagrams regarding the epidemiological studies (20 marks)

6.3. Briefly describe the Retrospective Cohort Study according to the timeline (30 marks)

6.4. State two types of data summarization methods for each the followings (20 marks)

6.4.1. Numerical Summaries

6.4.2. Graphical Summaries



## Annexure

F-table of Critical Values of $\alpha = 0.05$ for $F(df_1, df_2)$																			
	DF1=1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
DF2=1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.91	245.95	248.01	249.05	250.10	251.14	252.20	253.25	254.31
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.37
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25
$\infty$	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00





**Faculty of Health Sciences**  
**Bachelor of Science Honours in Biomedical Sciences**  
**BMS 3233 Transfusion Science**  
**Batch – 04**  
**3<sup>rd</sup> Year 2<sup>nd</sup> Semester**  
**End Semester SEQ Examination**

**Date** : 11.09.2023  
**Time** : 9.00am. – 11.00m. (Two Hours)

**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

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

- 1.1 Define the term Leukoreduction. (05 marks)
- 1.2 Mention the purposes of blood transfusion. (10 marks)
- 1.3 State two methods used for the process of Leukoreduction. (10 marks)
- 1.4 Differentiate an Autologous, Homologous and Heterologous blood transfusions. (15 marks)
- 1.5 Describe the indications and preparation of the below blood components
- 1.5.1 Whole blood (20 marks)
- 1.5.2 Red cell concentrate (20 marks)
- 1.5.3 Fresh frozen plasma (20 marks)

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

- 2.1 State how Coombs' reagent is prepared? (20 marks)
- 2.2 Describe the principle of a Coombs test. (30 marks)
- 2.3 Differentiate the process of Complete and Incomplete agglutination reactions. (20 marks)
- 2.4 Describe the principle of Direct and Indirect Coombs' test. (30 marks)

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

A 20-year-old female donor presented at a blood donation centre. This is her second time donating blood, she had her first whole blood donation 30 days ago. Furthermore, she is weighted 48 kg, in a good health at the time, declared she is free of pregnancy and has not engaged in at risk sexual activity within the past 12 months.

- 3.1 Describe the method of phlebotomy. (30 marks)



- 3.2 What criteria are considered when selecting a blood donor, and is the above-mentioned donor eligible for blood donation? (25 marks)
- 3.3 Mention the importance of appropriate donor blood selection. (10 marks)
- 3.4 State the purposes of collection of donor information and pre-donation counselling. (10 marks)
- 3.5 What is a blood bank's donor blood storage and management process? (25 marks)

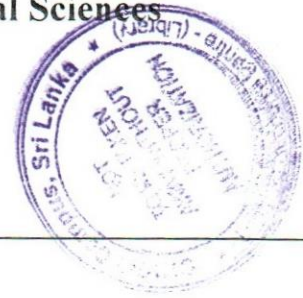
**Question 04****(100 Marks)**

Describe clinical presentation and treatment and management of allogenic blood transfusion reactions.

- 4.1 Acute haemolytic transfusion reaction (25 marks)
- 4.2 Transfusion Related Acute Lung Injury (TRALI) (25 marks)
- 4.3 Febrile non haemolytic transfusion reactions (25 marks)
- 4.4 Transfusion transmitted infections (25 marks)

**Faculty of Health Sciences**  
**Bachelor of Science Honours in Biomedical Sciences**

**BMS 3224 – Human Genetics**  
**3<sup>rd</sup> year 2<sup>nd</sup> semester – Batch 4**  
**End Semester SEQ Examination**



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**Date** : 08<sup>th</sup> September 2023  
**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.
- 

**Question 1** **(100 marks)**

- 1.1. List the structural features of chromosome. (20 marks)
- 1.2. Briefly explain three Mendelian laws. (30 marks)
- 1.3. Write short notes on the following.
- 1.3.1. Special types of chromosomes. (25 marks)
- 1.3.2. Structural chromosomal aberrations. (25 marks)

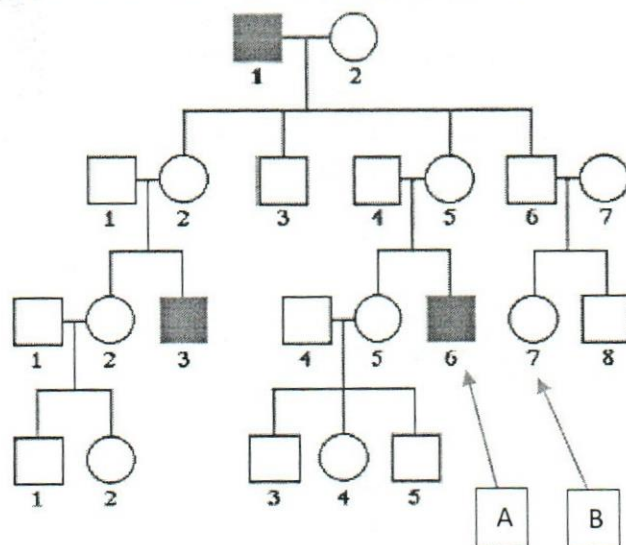
**Question 2** **(100 marks)**

- 2.1. Describe the Hardy-Weinberg law and its assumptions. (40 marks)
- 2.2. Cystic fibrosis is a recessive condition that affects about 1 in 2,500 babies in the Caucasian population of the United States. Calculate the following.
- 2.2.1. The frequency of the recessive allele in the population. (20 marks)
- 2.2.2. The frequency of the dominant allele in the population. (20 marks)
- 2.2.3. The percentage of heterozygous individuals (carriers) in the population. (20 marks)



**Question 3****(100 marks)**

Answer the following questions referring the pedigree chart given below.



3.1. Identify the inheritance pattern of the above pedigree. (20 marks)

3.2. Mention the genotypes of the affected individuals in the I and III generations and mention an example disease condition. (30 marks)

3.3. The mating is occurred between the individuals A and B in the above pedigree. Answer the following questions.

3.3.1. Write the genotypes of the offspring. (25 marks)

3.3.2. What is percentage of affected individuals? (25 marks)

**Question 04****(100 marks)**

4.1. What is CYP enzyme system ? (10 marks)

4.2. Warfarin metabolism vary from person to person and can change the therapeutic efficacy drug. Describe your answer taking CYP2C9 and warfarin as examples. (30 marks)

4.3. Describe how pharmacogenetic testing is helpful in practicing personalized medicine. (40 marks)

4.4. What is the common genetic polymorphism type seen in pharmacogenetic studies? (20 marks)

**Question 05****(100 marks)**

5.1. What is Pleiotropy? (20 marks)

5.2. State two examples for pleiotropy in human and animals. (20 marks)

5.3. What are the characteristics of the linkage? (20 marks)

5.4. Somatic and germinal crossing over leads to separation of the linked genes. Explain the mechanism of crossing over. (40 marks)

**Question 6** (100 marks)

6.1. What is the term of 'tumor suppressor gene'? (10 marks)

6.2. Briefly describe the genetic background of Chronic Myeloid Leukemia (CML). (20 marks)

6.3. Discuss two types of invasive prenatal testing. (40 marks)

6.4. Write short notes for the following topics.

6.4.1. Importance of genetic counselling. (15 marks)

6.4.2. Benefits of prenatal diagnosis. (15 marks)





**Faculty of Health Sciences**  
**Bachelor of Science Honours in Biomedical Science**  
**BMS 3253 Human Nutrition**  
**3<sup>rd</sup> year 2<sup>nd</sup> Semester**  
**End Semester SEQ Examination**  
**4<sup>th</sup> Batch**

**Date: 6<sup>th</sup> September 2023**

**Time: 9.00 a m – 11.00 a m**

**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

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**Question 01** **(100 marks)**

- 1.1 Describe necessary action to be needed to get overcome following complications during pregnancy.
- 1.1.1 Morning sickness **(25 marks)**
- 1.1.2 Constipation **(25 marks)**
- 1.2 Describe dietary changes suitable for patients with chronic kidney disease. **(25 marks)**
- 1.3 How can you lower the potassium content in the vegetables? **(25 marks)**

**Question 02** **(100 marks)**

- 2.1. Define therapeutic diet. **(10 marks)**
- 2.2. List 05 examples for therapeutic diet. **(15 marks)**
- 2.3. State 05 aims of diet therapy. **(20 marks)**
- 2.4. State the 6 major classes of nutrients and briefly describe the importance of two of them. **(55 marks)**

**Question 03** **(100 marks)**

- 3.1 Define 'Malnutrition' **(10 marks)**
- 3.2 List 05 secondary causes for malnutrition. **(15 marks)**
- 3.3 List 05 symptoms of each disorder following,
- 3.3.1 Marasmus. **(15 marks)**
- 3.3.2 Goiter. **(15 marks)**
- 3.4 Mention the vitamin deficiency causes the following disorders **(15 marks)**
- 3.4.1 Pellagra
- 3.4.2 Scurvy
- 3.4.3 Rickets
- 3.5 Describe the roles of the dietitian **(30 marks)**

**Question 04****(100 marks)**

Lily is 28 years old female who is 1.6m tall, and her weight is 68 kg. She is usually having a mixed diet and moderately active.

**For men:  $BMR = 66.5 + (13.75 \times \text{weight in kg}) + (5.003 \times \text{height in cm}) - (6.75 \times \text{age in years})$**

**For women:  $BMR = 655.1 + (9.563 \times \text{weight in kg}) + (1.850 \times \text{height in cm}) - (4.676 \times \text{age in years})$**

Activity Factor	Activity Level	Activity Level Definition
1.2	Sedentary	Little or no exercise
1.375	Lightly active	Light exercise or sports 1-3 days per week
1.55	Moderately active	Moderate exercise or sports 3-5 days a week
1.725	Very active	Hard exercise or sports 6-7 days a week
1.9	Extremely active	Hard daily exercise or sports and physical job

- 4.1. Find the body mass index (BMI) of Lily. **(20 marks)**
- 4.2. Calculate the basal energy expenditure (BEE) by using a Harris Benedict Equation. **(30 marks)**
- 4.3. Calculate the total energy expenditure by considering activity factor. **(30 marks)**
- 4.4. Comment on the energy expenditure of Lily and give two advice for a healthy life. **(20 marks)**

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**Faculty of Health Sciences****Bachelor of Science Honours in Biomedical Science/ Bachelor of Science  
Honours in Industrial Pharmaceutical Science/ Bachelor of Science Honours in  
Cosmetic Science****BMS 3213/CS 3213/IPS 3213 Pharmacology II****3<sup>rd</sup> Year 2<sup>nd</sup> Semester****End Semester SEQ Examination****4<sup>th</sup> Batch**

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**Date** : 04<sup>th</sup> September 2023  
**Time** : 09.00 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 01**

- 1.1. Describe the clinical uses of Benzodiazepine (30 marks)  
1.2. Describe action of general anesthetics (30 marks)  
1.3. Name the drugs used for the induction of anesthesia (20 marks)  
1.4. State two drugs used to local anesthesia (20 marks)

**Question 02**

- 2.1. Write an account on first and second generation antidepressants (25 marks)  
2.2. What are the advantages of second generation drugs over first generation? (25 marks)  
2.3. List the drugs for antipsychotics and clinical uses (25 marks)  
2.4. Compare two generations of antipsychotics (25 marks)

**Question 03**

- 3.1. What are the two types of commercial thyroxine available in the market? (20 marks)  
3.2. What is your advice to patient taking thyroxine? (20 marks)  
3.3. Describe mode of action of one anti-thyroid drug (25 marks)  
3.4. List the examples for NSAID in relieving inflammation and briefly indicate the site of action (35 marks)

**Question 04**

- 4.1 Describe drugs used in acne (25 marks)  
4.2. Name two keratolytics used in Dermatology treatment (25 marks)  
4.3. List the antibiotics used in the dermatology (25 marks)  
4.4. List the types of steroids used in dermatitis (25 marks)

**Question 05**

- 5.1. What are the clinical uses testosterone preparations? (25 marks)  
5.2. List two adverse effects of above (20 marks)  
5.3. Indicate types of immunomodulators (30 marks)  
5.4. Describe the mode of action of one group you mentioned in 5.3 (25 marks)

**Question 06**

6. Describe the,  
6.1. difference between Soluble insulin and insulin glargine (25 marks)  
6.2. metformin (25 marks)  
6.3. action of Sitagliptin (25 marks)  
6.4. side effects and storage of insulin (25 marks)





Faculty of Health Sciences  
Bachelor of Science (Honours) in Science Biomedical Sciences

**BMS 3244**  
**Ethics, Research Methodology and Statistics**

3<sup>rd</sup> Year 2<sup>nd</sup> Semester  
Batch 02 and 03

**End Semester SEQ Examination**

Date: 30<sup>th</sup> of January 2023

Time: 09.00 am – 12.00 pm (Three Hours)

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

- 1.1. What is "Data"? (10 marks)
- 1.2. Compare the data types of discrete and continuous data. (20 marks)
- 1.3. Write two examples for each data type mentioned below.  
Nominal, ordinal, ratio and interval (30 marks)
- 1.4. Briefly explain the probability sampling methods. (40 marks)

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

- 2.1. Prepare the following table by including **two** relevant research ethics **per** each step.

Research ethics in		
Planning	Conducting	Publishing

(40 marks)

2.2. A Biomedical scientist expected to do a toxicity analysis experiment using fish as trial organisms. Therefore, he brought a fish species and reared them under the laboratory conditions.

Before taking them to the experiment, he wished to examine the relationship between the length of a fish and the weight of feed given to them during the rearing period. A linear regression analysis was run from SPSS software package, for a collected dataset.

2.2.1. Define the dependent and independent variables. (20 marks)

2.2.2. Comment on the P value. (40 marks)

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	7.500	7.115		1.054	.402	-23.114	38.114
	a	2.750	1.299	.832	2.117	.168	-2.839	8.339

a. Dependent Variable: b

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.832 <sup>a</sup>	.691	.537	5.80948	.691	4.481	1	2	.168

a. Predictors: (Constant), a

### Question 03

(100 Marks)

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

3.1. Estimate the population mean with 95% confidence Intervals. (30 marks)

3.2. What percentage of data values are actually within  $\pm 1$  and within  $\pm 2$  standard deviation of the mean? (50 marks)

3.3. Comment on distribution of data considering the skewness. (20 marks)

### Question 04

(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



- 4.1. Find the mean, mode, median of this data. (20 marks)
- 4.2. Calculate the variance and standard deviation. (30 marks)
- 4.3. Testing two flu drugs A and B. Drug A works on 41 people out of a sample of 195. Drug B works on 351 people in a sample of 605. Is it possible to compare the two drugs?  
Apply 5% confidence interval.
- 4.3.1. Find the proportions for drug A and B. (25 marks)
- 4.3.2. Find overall sample proportion. (10 marks)
- 4.3.3. Solve the question using z-test and write the conclusion. (15 marks)

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

- 5.1. The starting point of a research is the selection of a research topic and problem. Mention five attributes of a good research topic. (20 marks)
- 5.2. What are the steps of scientific method? (20 marks)
- 5.3. Write a brief description about Hypothesis testing. (30 marks)
- 5.4. A researcher is conducting an experiment to find whether a plant extract (A) could kill the mosquito larvae in the field sample. Write the null and alternative hypothesis for the above research question? (30 marks)

**Question 06****(100 marks)**

- 6.1. State the classification of epidemiological study designs. (20 marks)
- 6.2. List 4 steps of a case control study. (20 marks)
- 6.3. List the types of bias in case control study design. (30 marks)
- 6.4. Briefly describe the terms "Prevalence" & "Incidence". (30 marks)

Z-Table

Z	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Equations

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$



**Faculty of Health Sciences**  
**Bachelor of Science (Hons) in Biomedical Sciences**  
**BMS 3233 – Transfusion Science**  
**3<sup>rd</sup> Year 2<sup>nd</sup> Semester**  
**Batch 02 & 03**  
**End Semester SEQ Examination**



INDEX NUMBER: .....

Date : 23.01.2023  
Time : 9.00 am – 11.00 am

**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- The paper will be for two hours (9.00 am – 11.00 am).
- You should write **answers in lined papers** legibly in black or blue ink.

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

Describe the clinical presentation, laboratory diagnostic methods, treatment, and management of allogenic blood transfusion reactions.

- 1.1 Transfusion transmitted infections (25 marks)
- 1.2 Transfusion Related Acute Lung Injury (TRALI) (25 marks)
- 1.3 Haemolytic transfusion reaction (25 marks)
- 1.4 Massive transfusion (25 marks)

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

A 55-year-old male donor presented at a blood donation centre. This is his second blood donation; his first whole blood donation was 54 days ago. Furthermore, he is 50 kg, in good health at the time, and has declared he has not engaged in at risk sexual activity within the past 6 months.

- 2.1 What criteria are considered when selecting a blood donor, and is the above-mentioned donor eligible for blood donation? (25 marks)
- 2.2 Mention the importance of appropriate donor blood selection. (10 marks)
- 2.3 State the purposes of collection of donor information and pre-donation counselling. (10 marks)
- 2.4 Describe the process of phlebotomy performed during blood collection. (30 marks)
- 2.5 Describe the donor blood storage and management process within a blood bank. (25 marks)

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

- 3.1 Mention the purposes of blood transfusion. (5 marks)
- 3.2 Define Rational Use of Blood Products (20 marks)
- 3.3 Describe the principle of antiglobulin test (30 marks)
- 3.4 Differentiate autologous and allogenic blood transfusion. (20 marks)
- 3.5 Describe the process of separation of whole blood components in a blood bank laboratory. (25 marks)

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

- 4.1 Describe the genetic inheritance of Rh antigen on erythrocytes. (25 marks)
- 4.2 Describe the characters of below components on the red blood cell membrane.
- 4.2.1 A antigen (25 marks)
- 4.2.2 B antigen (25 marks)
- 4.2.3 O antigen (25 marks)



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**Faculty of Health Sciences**  
**Bachelor of Science Honours in Biomedical Sciences**

**BMS 3224 – Human Genetics**  
**3<sup>rd</sup> year 2<sup>nd</sup> semester – Batch 2 and 3**  
**End Semester SEQ Examination**

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**Date** : 20<sup>th</sup> January 2023  
**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.
- 

<b>Question 1</b>	<b>(100 marks)</b>
1.1. What is Karyotype?	(20 marks)
1.2. List the structural features of chromosome.	(20 marks)
1.3. Describe structural chromosomal aberrations.	(30 marks)
1.4. Write short notes on the following.	
1.4.1. Model organisms used in genetic studies.	(15 marks)
1.4.2. Importance of human genome project.	(15 marks)

**Question 2****(100 marks)**

In humans, the alleles responsible for the blood type are designated as  $I^A$  (A-type blood),  $I^B$  (B-type blood) and  $i$  (O type blood).

2.1. What are the expected frequencies of phenotypes in the following matings?

A%    B%    O%    AB%

2.1.1.  $I^A I^A \times I^B i$  (20 marks)

2.1.2.  $I^A I^B \times I^A i$  (20 marks)

2.1.3.  $ii \times I^A i$  (20 marks)

2.2. Briefly describe three Mendelian laws of inheritance. (40 marks)

**Question 3****(100 marks)**

3.1. What is codominance? (10 marks)

3.2. Differentiate the concepts of codominance and incomplete dominance. (20 marks)

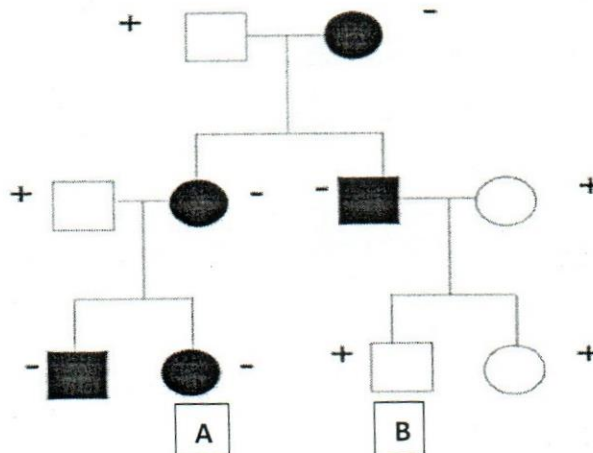
3.3. What are the characteristics of the linkage? (20 marks)

3.4. Discuss the importance of development of genetic maps. (30 marks)

3.5. Somatic and germinal crossing over leads to separation of the linked genes. Briefly explain the steps of crossing over. (20marks)

**Question 4****(100 marks)**

Answer the following questions referring the pedigree chart given below.



4.1. Identify the inheritance pattern of the above pedigree. (20 marks)

4.2. Mention the genotypes of the affected individuals in the III generation. (30 marks)



4.3. The mating is occurred between the individuals A and B in the above pedigree. Answer the following questions.

4.3.1. Write the genotypes of the offspring. (25 marks)

4.3.2. What is percentage of affected individuals? (25 marks)

**Question 5 (100 marks)**

5.1. Metabolism of a drug vary from person to person and can change the therapeutic efficacy of a drug. Describe your answer taking CYP2C9 and warfarin as examples. (40 marks)

5.2. Describe how pharmacogenetic testing is helpful in practicing personalized medicine. (40 marks)

5.3. What is the common genetic polymorphism type seen in pharmacogenetic studies? (10 marks)

5.4. List two drugs which inhibit the hepatic metabolizing enzyme. (10 marks)

**Question 6 (100 marks)**

6.1. What is the term of 'Oncogene'? (10 marks)

6.2. Briefly describe the importance of the tumour suppressor gene. (20 marks)

6.3. Discuss the common types of non-invasive prenatal testing. (40 marks)

6.4. Write short notes for the following topics.

6.4.1. Importance of genetic counselling. (15 marks)

6.4.2. Benefits of prenatal diagnosis. (15 marks)



**Faculty of Health Sciences**  
**Bachelor of Science Honours in Biomedical Sciences**

**BMS 3213 – Pharmacology II**

**Batch – 01 (Repeat)**

**3<sup>rd</sup> year 2<sup>nd</sup> semester**

**End Semester SEQ Examination**

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

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**Date:** 20<sup>th</sup> of June 2022

**Time:** 9.00 am – 12.00 pm

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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.



1. Describe the pharmacological basis of using
  - 1.1. Aspirin in stable angina (25 marks)
  - 1.2. Morphine in Myocardial infarction (25 marks)
  - 1.3. Frusemide in pulmonary edema (25 marks)
  - 1.4. Soluble insulin in acute hyperglycemia (25 marks)
2. Describe the mode of action of
  - 2.1. Metformin (25 marks)
  - 2.2. Thyroxine (25 marks)
  - 2.3. Sitagliptin (25 marks)
  - 2.4. Heparin (25 marks)
3. Describe the pharmacological action and effects of
  - 3.1. Clopidogrel (25 marks)
  - 3.2. Warfarin (25 marks)
  - 3.3. Prednisolone (25 marks)
  - 3.4. Carbimazole (25 marks)
4.
  - 4.1. List the different types of oral steroids in clinical practice. (20 marks)
  - 4.2. Describe the common clinical indications of steroids. (20 marks)
  - 4.3. Indicate common adverse effects of steroids. (20 marks)
  - 4.4. What are the other routes of giving steroids to patients? (20 marks)
  - 4.5. Name 3 drugs given in other routes of administration. (20 marks)
5.
  - 5.1. Describe the different types of contraceptives methods. (40 marks)
  - 5.2. Name the composition of one the method you mentioned in 5.1. (20 marks)
  - 5.3. Describe the common advice a pharmacist would give to a patient. (20 marks)
  - 5.4. List the drugs used to stimulate uterus. (20 marks)
6.
  - 6.1. Describe the mode of action of Lignocaine. (35 marks)
  - 6.2. List the drugs for antidepressants. (20 marks)
  - 6.3. What are the drugs used for anxiety? (25 marks)
  - 6.4. List the common adverse effects of the drugs mentioned in 6.3. (20 marks)



**CINEC**  
**CAMPUS**  
*Beyond A Graduate*



**Faculty of Health Sciences**  
**Bachelor of Science (Honours) in Biomedical Sciences**

**BMS 3244**  
**Ethics, Research Methodology and Statistics**

**3<sup>rd</sup> Year 2<sup>nd</sup> Semester**  
**Batch 01**

**End Semester SEQ Examination**

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

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**Date:** 23<sup>rd</sup> of February 2022

**Time:** 09.00 am – 12.00 pm (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 01** (100 marks)

- 1.1. List criteria of "Good Research". (30 marks)
- 1.2. Define Research Ethics. (10 marks)
- 1.3. List important issues related to ethical concern in research. (10 marks)
- 1.4. Discuss ethical issues commonly seen in animals research and methods to minimize those ethical issues. (50 marks)

**Question 02** (100 marks)

- 2.1. Describe the different methods of qualitative and quantitative data interpretation. (Illustrate your answer graphically)

**Question 03** (100 marks)

- 3.1. State Probability and Non-Probability Sampling. (20 marks)
- 3.2. Describe four types of Probability Sampling techniques (40 marks)
- 3.3. Define Point Estimate, Interval Estimate and Confidence Interval separately. (30 marks)

**Question 04** (100 marks)

- 4.1. Discuss the skewness and kurtosis. (50 marks)
- 4.2. The following frequency distribution represents the ages of 30 students in a statistics class. Find the mean age of the students and the standard deviation of the frequency distribution. (50 marks)

<b>Class</b>	<b>Mid-point (m)</b>	<b>Frequency (f)</b>
18-25	21.5	13
26-33	29.5	8
34-41	37.5	4
42-49	45.5	3
50-57	53.5	2

**Question 05****(100 marks)**

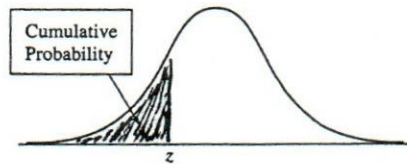
- 5.1. The test scores for a very large lecture class are approximately normally distributed with a mean of 62.5 points and a standard deviation of 12.4 points.
- 5.1.1. What percent of the test scores are higher than 80.0 points? These people will get "A"s. Write your answer to the nearest hundredth (that is, to two decimal places) of a percent. (20 marks)
- 5.1.2. What percent of the test scores are between 50.0 points and 65.0 points? These people will get "C"s. Write your answer to the nearest hundredth of a percent. (20 marks)
- 5.1.3. The students who scored in the bottom 4% of the class will get "F"s, and only those students. Find the cutoff score for an "F." Round off your answer to the nearest point. (20 marks)
- 5.2. Suppose prior elections indicated that it is necessary for a candidate for governor to receive at least 80% of the vote. The incumbent governor is interested in assessing his chance for returning to office and plans to conduct a survey of 2000 registered voters in his section. The survey revealed that 1550 planned to vote for the incumbent governor.
- 5.2.1. State null hypothesis & alternative hypothesis. (10 marks)
- 5.2.2. Using the level of significance as 0.05 in hypothesis –testing procedure, assess the governor's chance of reelection. (30 marks)

**Question 06****(100 marks)**

- 6.1. State the classification of epidemiological studies. (20 marks)
- 6.2. Briefly describe the advantages & disadvantages of Case control study design. (30 Marks)
- 6.3. Write 02 hypothesis that you suggest for your own research study. (30 Marks)
- 6.4. What is the best study designs which are useful to assess causal relationship? (10 marks)
- 6.5. Which study design is most suitable for the study of rare diseases? (10 marks)



## APPENDIX A

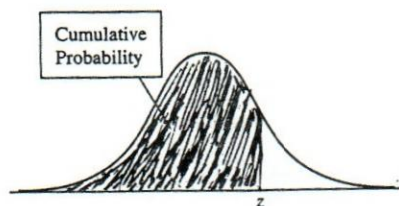


Cumulative probability for  $z$  is the area under the standard normal curve to the left of  $z$

**TABLE A Standard Normal Cumulative Probabilities**

$z$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-5.0	.00000287									
-4.5	.00000340									
-4.0	.0000317									
-3.5	.000233									
-3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
-3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
-3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
-3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
-3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
-2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
-2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
-2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
-2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
-2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
-2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
-2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
-2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
-2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
-2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
-1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
-1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
-1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
-1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
-1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
-1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
-1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
-1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
-1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
-1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
-0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
-0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
-0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
-0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
-0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
-0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
-0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
-0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
-0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
-0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641





Cumulative probability for  $z$  is the area under the standard normal curve to the left of  $z$ .

**TABLE A Standard Normal Cumulative Probabilities (continued)**

$z$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

$z$	.00
3.5	.999767
4.0	.9999683
4.5	.9999966
5.0	.99999713



**t Table**

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	<b>0.50</b>	<b>0.25</b>	<b>0.20</b>	<b>0.15</b>	<b>0.10</b>	<b>0.05</b>	<b>0.025</b>	<b>0.01</b>	<b>0.005</b>	<b>0.001</b>	<b>0.0005</b>
two-tails	<b>1.00</b>	<b>0.50</b>	<b>0.40</b>	<b>0.30</b>	<b>0.20</b>	<b>0.10</b>	<b>0.05</b>	<b>0.02</b>	<b>0.01</b>	<b>0.002</b>	<b>0.001</b>
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
<b>Z</b>	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	<b>Confidence Level</b>										

Approximate mean

$$\bar{X} = \frac{\sum_{j=1}^c m_j f_j}{n}$$

Approximate standard deviation:

$$S = \sqrt{\frac{\sum m^2 f - \frac{(\sum mf)^2}{n}}{n-1}}$$

Z - Calculations

$$Z = \frac{X - \mu}{\sigma}$$

$$Z = \frac{\bar{X} - \mu}{s / \sqrt{n}}$$

t- Calculations

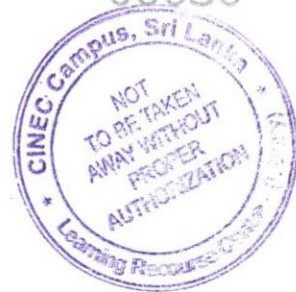
$$t = \frac{\bar{X} - \mu}{s / \sqrt{n}}$$

Single Population Proportion

$$z = \frac{p - \pi}{\sqrt{\frac{\pi(1 - \pi)}{n}}}$$



00030



**Faculty of Health Sciences**  
**Bachelor of Science (Hons) in Biomedical Sciences**  
**BMS 3233 – Transfusion Science**  
**3<sup>rd</sup> Year 2<sup>nd</sup> Semester**  
**Batch 01**  
**End Semester SEQ Examination**

INDEX NUMBER: .....

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Date : 21.02.2022  
Time : 9.00 am – 11.00 am

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- The paper will be for two hours (9.00 am – 11.00 am).
- You should write **answers in lined papers** legibly in black or blue ink.

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

- 1.1 Mention the functions of cross match. 5 (10 marks)
- 1.2 Describe the structure of Human Leukocyte Antigen (HLA) Protein. 10 (30 marks)
- 1.3 State the occasions which trigger HLA antibody production. 10 (20 marks)
- 1.4 Compare the advantages and disadvantages of ELISA technique when screening for HLA antibodies. 10 (20 marks)
- 1.5 State the steps of HLA typing via serological method (Microcytotoxicity method). 10 (20 marks)

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

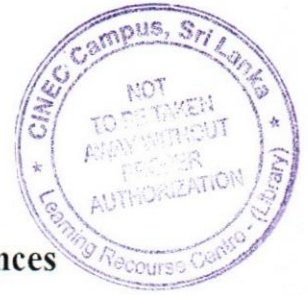
- 2.1 Define Rational use of blood. 5 (10 marks)
- 2.2 Describe the separation and indications of following blood components
- 2.2.1 Red Cell Concentrate - *anemia* 5 (30 marks)
- 2.2.2 Platelet concentrate 5 (30 marks)
- 2.2.3 Fresh Frozen Plasma (FFP) 5 (30 marks)

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

- 3.1 Mention the importance of appropriate donor blood selection. 5 (10 marks)
- 3.2 What are the criteria checked when selection for blood donor? 10 (25 marks)
- 3.3 State the purposes of collection of donor information and pre-donation counselling. 5 (10 marks)
- 3.4 Describe the method of phlebotomy. 5 (30 marks)
- 3.5 What are the donor blood storage and management process of a blood bank? 15 (25 marks)

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

- 4.1 Describe clinical presentation and treatment/management of allogenic blood transfusion reactions. 35
- 4.1.1 Acute haemolytic transfusion reaction 15 (25 marks)
- 4.1.2 Transfusion Related Acute Lung Injury (TRALI) 5 (25 marks)
- 4.1.3 Febrile non haemolytic transfusion reactions 10 (25 marks)
- 4.1.4 Transfusion transmitted infections 10 (25 marks)



Faculty of Health Sciences  
Bachelor of Science Honours in Biomedical Sciences  
BMS 3224 - Human Genetics  
Batch – 01  
3<sup>rd</sup> Year 2<sup>nd</sup> Semester  
End semester SEQ Examination

INDEX NUMBER: .....

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Date : 15<sup>th</sup> of February 2022  
Time : 9.00 am. – 12.00 pm (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.
- Candidates are permitted to use scientific calculators.
- You are not allowed to take out the examination papers.



**QUESTION 01**

**(100 marks)**

- 1.1. Metabolism of a drug vary from person to person and can change the therapeutic efficacy of a drug. Explain your answer taking CYP2C9 and warfarin as examples. (40 marks)
- 1.2. Describe how pharmacogenetic testing is helpful in practicing personalized medicine. (40 marks)
- 1.3. What is the common genetic polymorphism type seen in pharmacogenetic studies? (10 marks)
- 1.4. List two drugs which inhibit the hepatic metabolizing enzyme. (10 marks)

**QUESTION 02**

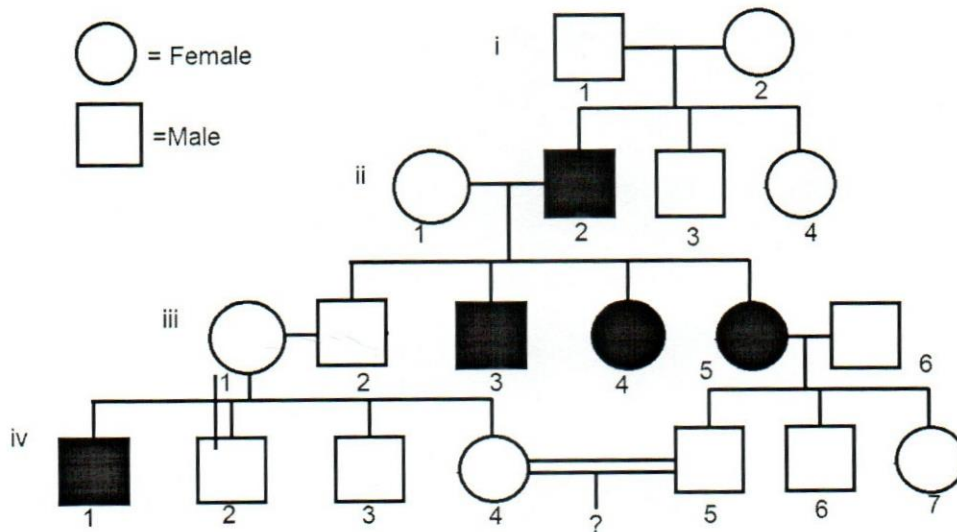
**(100 marks)**

- 2.1. *Drosophila melanogaster* is a commonly used model organism for genetic studies. Discuss on the importance of this organism for genetic studies. (30 marks)
- 2.2. Compare and contrast between lamp brush and polytene chromosome types. (20 marks)
- 2.3. Describe the coupling and repulsion hypothesis of genetic linkage using a diagram. (30 marks)
- 2.4. Discuss on the significance of genetic linkage. (20 marks)

**QUESTION 03**

**(100 marks)**

3.1. Answer the following questions referring to the given pedigree chart.



- 3.1.1. Identify the pedigree type by providing reasons. (30 marks)
- 3.1.2. Mention the genotypes of the affected individuals. (20 marks)

3.1.3. Discuss the probability of the 4<sup>th</sup> & 5<sup>th</sup> individuals of generation IV having a child with the trait. (20 marks)

3.2. Discuss the structural aberration of chromosomes with examples. (30 marks)

**QUESTION 04**

**(100 marks)**

A study was conducted to measure the resistance of a population of laboratory mice to Ebola virus.

R1 = resistant; R2 = sensitive

Genotypes	R1R1	R1R2	R2R2
Observed numbers	20	45	35

4.1 Calculate the observed genotype frequencies. (30 marks)

4.2 Calculate the R1 and R2 allele frequencies. (20 marks)

4.3 What are the expected genotypic frequencies? (30 marks)

4.4 Assume that the population is in Hardy-Weinberg equilibrium if observed genotypic frequencies are within 15% of expected genotypic frequencies. If so, is this population in Hardy-Weinberg equilibrium? Justify your answer. (20 marks)

**QUESTION 05**

**(100 marks)**

5.1 If a mother with sickle cell anemia and a father with sickle cell anemia trait (carrier) have children, calculate the percentages of the offspring with different phenotypes using Punnett square. (35 marks)

5.2 ABO blood type in humans is determined by three alleles: I<sup>A</sup>, I<sup>B</sup>, i.

5.2.1 What are the possible genotypes for blood group A? (06 marks)

5.2.2 What are the alleles that shows co-dominance? (04 marks)

5.3 A mother of a child with blood type O has blood type A. Discuss the possible genotypes and phenotypes of the father. (25 marks)

5.4 A study was performed to estimate the heritability of human height. Heritability estimates were initially performed in children (average age 6 years old) and found to be 0.64. Heritability was estimated again in the same set of individuals when they were adults (average age 40 years old) and found to be 0.24. Justify this finding. (30 marks)

**QUESTION 06**

**(100 marks)**

- 6.1 Describe the importance of pre-natal testing. (30 marks)
- 6.2 List two invasive and non-invasive pre-natal diagnostic tests. (20 marks)
- 6.3 Recently married 40-yearold female and 42-year-old male partners came to the genetic clinic for counseling for planning their pregnancy.
- 6.3.1 List the steps you would engage with this couple during Genetic counseling session. (20 marks)
- 6.3.2 State two types of Genetic counseling. (05 marks)
- 6.3.3 Briefly state the code of ethics in genetic counseling. (15 marks)
- 6.3.4 List the goals of genetic counseling in this couple. (10 marks)



*Silvery*

00033



**Faculty of Health Sciences**  
**Bachelor of Science Honours in Biomedical Science**

**BMS 3253 Human Nutrition**  
**3<sup>rd</sup> Year 2<sup>nd</sup> Semester**  
**Mid Semester SEQ Examination**  
**1<sup>st</sup> Batch**

INDEX NUMBER: .....

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**Date** : 2<sup>nd</sup> December 2021  
**Time** : 1.30 p.m. – 2.30 p.m. (One hour)

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**INSTRUCTIONS TO CANDIDATES**

- This question paper consists of **TWO** questions.
- Answer **ALL** questions.
- The paper will be for one hour (9.00 a.m. – 10.00 a.m.).
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

**Question 1****(100 marks)**

Following shows a detail of a ward patient. Answer all the questions using the given equation.

**Patient details:**

Patient Name : Mr Saman Kumara  
 Age of the patient : 45 years old  
 Height : 165 cm  
 Weight : 56 kg

**Male Basal Energy Expenditure (BEE) kcal/day = 66.47 + 13.7 (weight in kg) + 5 (height in cm) – 6.76 (age in years)**

**Female BEE kcal/day = 655.09 + 9.56 (weight in kg) + 1.85 (height in cm) – 4.68(age in years)**

Activity Factor	Activity Level	Activity Level Definition
1.2	Sedentary	Little or no exercise
1.375	Lightly active	Light exercise or sports 1-3 days per week
1.55	Moderately active	Moderate exercise or sports 3-5 days a week
1.725	Very active	Hard exercise or sports 6-7 days a week
1.9	Extremely active	Hard daily exercise or sports and physical job

**Patient nutrient requirements**

Carbohydrates - 60%  
 Protein - 10 %  
 Fat - 30 %

- 1.1 Find the body mass index (BMI) of the patient. (20 marks)
- 1.2 Calculate the basal energy expenditure (BEE) by using a Harris Benedict Equation. (20 marks)
- 1.3 Calculate the total energy expenditure by considering activity factor. (20 marks)
- 1.4 Find the gram value of carbohydrate which is eaten by the patient without considering diet induced thermogenesis. (20 marks)
- 1.5 Define following terms.
  - 1.5.1 Wasting (10 marks)
  - 1.5.2 Stunting (10 marks)

**Question 2****(100 marks)**

- 2.1 What is glycemic index? (10 marks)
- 2.2 Write one example for each of the following food items.
  - 2.2.1 Food with low glycemic load (5 marks)
  - 2.2.2 Food with medium glycemic load (5 marks)
  - 2.2.3 Food with high glycemic load (5 marks)



- 2.3 Briefly describe the dietary advice that you would give to a patient with atherosclerosis. (25 marks)
- 2.4 State the recommended daily calorie intake for men and women. (20 marks)
- 2.5 Describe the factors that you should consider when reading a food label. (30 marks)