

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2017

Marks scored:

Level : B. Tech
Year : II

Course : BIOT 203
Semester : I

Exam. Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

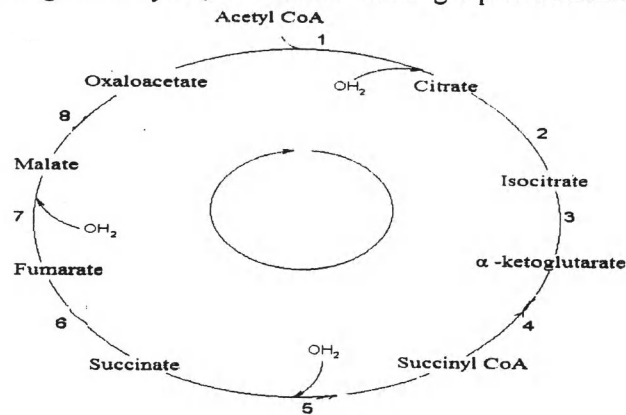
Date : MAR 24 2017

SECTION "A"

[20 Q. × 1 = 20 marks]

- The pK (side chain), $pK(\text{COOH})$, $pK(\text{NH}_3)$, value for glutamic acid are 3, 7 and 11 respectively, the isoelectric point (pI) is
a. 6 b. 5 c. 9 d. 7
- Following R groups characterize polar or Acidic, amino acids **EXCEPT**:
a. $-\text{CH}_2\text{OH}$ b. CH_2SH c. CH_2COOH d. CH_2NH_2
- All of the following statements about Michaelis-Menten constant K_m are true **EXCEPT**:
a. It is the substrate concentration at which the reaction rate is half of its maximum value
b. If an enzyme has a small value of K_m , it achieves its maximum catalytic efficiency at low substrate concentrations
c. It indicates that half of the enzyme molecules are bound with the substrate molecules when the substrate concentration equals K_m value
d. K_m value is directly proportional to the strength of binding of Enzyme and Substrate.
- Which of the following is **not true** of the reactions and enzymes in the glycolytic pathway?
a. Triose phosphate isomerase is referred to as a "perfect enzyme" because the product is formed as soon as enzyme and substrate collide.
b. Phosphoglucose isomerase converts the glucose ring to a fructose ring.
c. The reaction converting 2-phosphoglycerate to phosphoenolpyruvate is a dehydration reaction.
d. Phosphofructokinase is stimulated by ATP and citrate.
- If the genetic code consisted of four bases per codon rather than three, the maximum number of unique amino acids that can be encoded will be
a. 16 b. 64 c. 512 d. 256
- The 51 a.a long insulin has two chains A and B that are connected by:
a. Two H bonds in 7th-7th and 20th-20th residues
b. One H bond in 20th-20th residue and one SH bond in 7th-7th residue
c. Two SH bonds in 8th-7th and 9th-6th residues
d. Two SH bonds in 7th-7th and 20th-19th residues

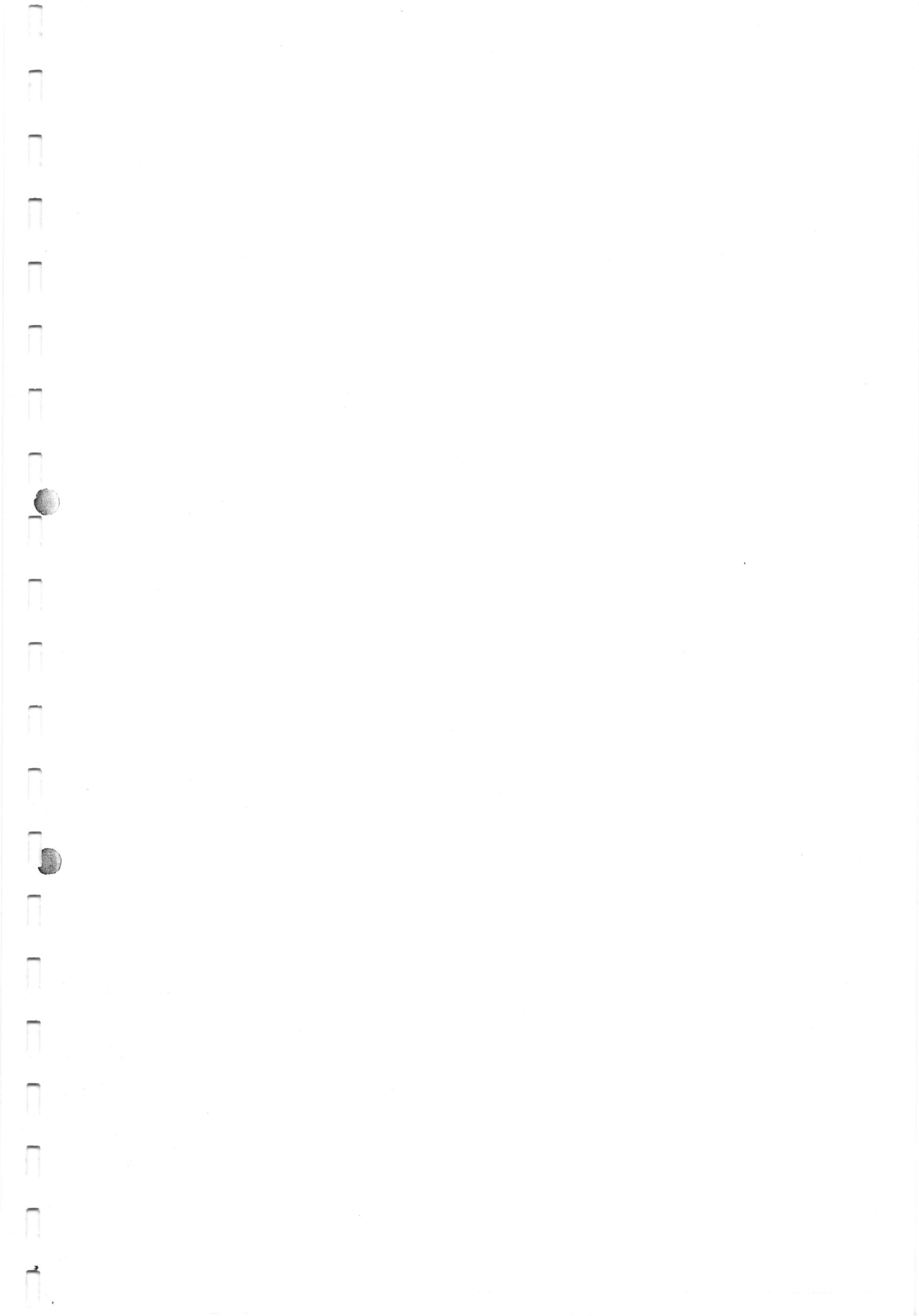
7. Given the following TCA cycle, ATP and reducing equivalents are produced in:



- a. Steps 3, 4, 6 and 8
b. Steps 3, 4, 5 and 6
c. Steps 3, 4, 5, 6 and 8
d. Steps 3, 4 and 8
8. The following enzyme is not a part of TCA cycle:
a. Isocitrate dehydrogenase
b. Succinyl phosphate
c. Succinate dehydrogenase
d. Succinyl CoA synthetase
9. If amytal is used as an inhibitor of electron transport chain, the total no. of ATP formed during a normal electron transport chain is:
a. 3
b. 2
c. 0
d. 1.5
10. Fatty acids with the chain length less than 12 requires _____ enzyme for the activation
a. Carnitine acyl transferase
b. Fatty acyl-CoA synthase
c. Fatty acyl-CoA synthetase
d. For <12 C, there are no enzymes
11. The production of Pregnenolone from dihydroxycholesterol is catalyzed by:
a. Desmolase
b. HMG-CoA reductase
c. Squalene oxidase
d. Prenyltransferase
12. Adenine is an example of:
a. Nucleotide
b. Nucleoside
c. Base
d. Ribonucleotide
13. The committed step in mammals during de novo purine biosynthesis is catalyzed by
a. Glycinamideribonucleotide transformylase
b. Carbamoyl phosphate synthetase II
c. Glutamine – phosphoribosyl pyrophosphate amidotransferase
d. 5-phosphoribosylamine synthetase
14. Asparagine and Aspartate are converted to _____ in amino acid oxidation.
a. Pyruvate
b. Oxaloacetate
c. Succinyl CoA
d. Glucose
15. The coenzyme required by aminotransferase is:
a. Pyridoxal phosphate
b. Riboflavin
c. Niacin
d. Pyridoxamine phosphate
16. The zymogens involved in protein digestions are synthesized in:
a. Parietal cells of gastric mucosa
b. Chief cells of gastric mucosa
c. Pancreatic parietal cells
d. Endoplasmic reticulum of pancreas

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17. The branch point in the synthesis of amino acids, belonging to oxaloacetate family is:
a. Aspartyl β -phosphate
b. Homoserine
c. Aspartate β -semialdehyde
d. Succinylhomoserine
18. 3-phosphoglycerate is converted to 3-phosphohydroxypyruvate by enzyme:
a. Phosphoserine aminotransferase
b. Phosphoglycerate dehydrogenase
c. Phosphoserine phosphatase
d. Serine hydroxymethyl-transferase
19. Which of the following types of bonds are least likely to be involved in stabilizing the three dimensional structure of protein?
a. Hydrogen bond
b. Disulfide bond
c. Hydrophobic bond
d. Ester bond
20. All the following statements are true about steroid hormones **except**
a. Their receptors are intracellular
b. They require cyclic AMP as second messenger
c. They are hydrophobic
d. They require carriers to transport them in circulation



KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2017

MAR 24 2017

Level : B. Tech.
Year : II
Time : 2hrs. 30 mins.

Course : BIOT 203
Semester: I
F.M. : 55

SECTION "B"

Attempt ALL questions. Support your answer with figures, equations, flowcharts and structures whenever applicable.

1. On the basis of proteins and amino acids, answer the following questions:
 - a. What are secondary structures of protein? How do they get their spatial conformation? [2]
 - b. What is International Unit of enzyme? [1]

2. On the basis of enzymes and enzyme kinetics, answer the following questions: [5+1]
 - a. The following data is based on an enzyme kinetic reaction of hexokinase on substrate glucose. In addition, data in the presence of inhibitors Y and Z are also given. Deduce V_{max} and K_m of the enzyme. Elucidate the mode of inhibitions and explain any one of them.

Glucose [mM]	Rate of formation of glucose 6-phosphate [mM/min]	Rate of formation of glucose 6-phosphate in presence of Y [mM/min]	Rate of formation of glucose 6-phosphate in presence of Z [mM/min]
0.025	0.025	0.0222	0.01666
0.0222	0.0235	0.02105	0.01538
0.02	0.0222	0.02	0.01428
0.01818	0.02105	0.01904	0.01333
0.01666	0.02	0.01818	0.0125
0.01538	0.01904	0.01739	0.01176

- b. Enzymatic catalysis is specific than chemical catalysis. Explain [3]

3. On the basis of carbohydrates and carbohydrate metabolism, answer the following questions
 - a. What is intra-molecular cyclization? Explain it with reference to glucose. [3]
 - b. How is pyruvate oxidized to yield energy? [4]
 - c. It is said that glycolysis and gluconeogenesis are regulated reciprocally. Explain! [3]
 - d. How is blood glucose level regulated after and in between meals? [3]

4. On the basis of electron transport chain, answer the following questions:
 - a. One molecule of NADH, generated in the cytosol can either generate 2.5 ATP or 1.5 ATP. How do these generations take place? List both and explain any one. [3]
 - b. Why were uncouplers once given to obese people to reduce weight? [2]
 - c. How are ATP transported outside the mitochondrial matrix? [2]

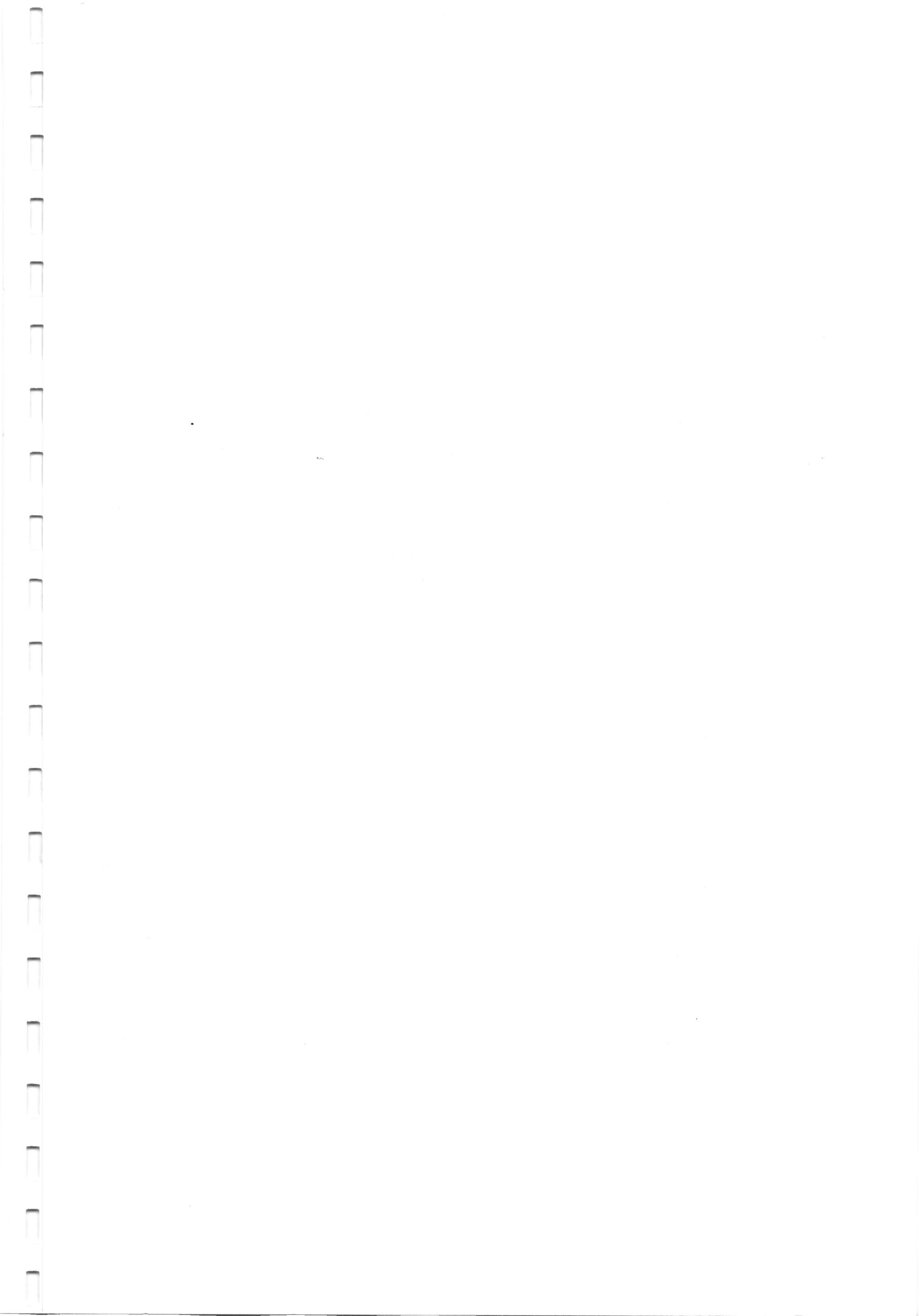
5. On the basis of lipids and lipid metabolism, answer the following questions:
 - a. How does stored fats reach the mitochondria? [4]
 - b. How are fatty acids oxidized? [2]
 - c. How is cholesterol synthesized? [4]

6. On the basis of protein metabolism, answer the following questions:
- a. What is glucose alanine cycle? [2]
 - b. On a physiological perspective, how are proteins digested and uptaken by small intestine? [3]
7. On the basis of nucleotide and nucleotide metabolism, answer the following questions:
- a. Where does the hydrogen in the active site of ribonucleotidreductase come from?
How does the enzyme works? Explain its working mechanism. [2+2]
 - b. Why is allopurinol given to treat gout? [2]
8. On the basis of amino acid synthesis OR vitamins and hormones, answer the following questions:
- How is proline synthesized? Why is arginine not synthesized from glutamate phosphate? [2]
- OR**
- How does steroid hormones act in the body? [2]

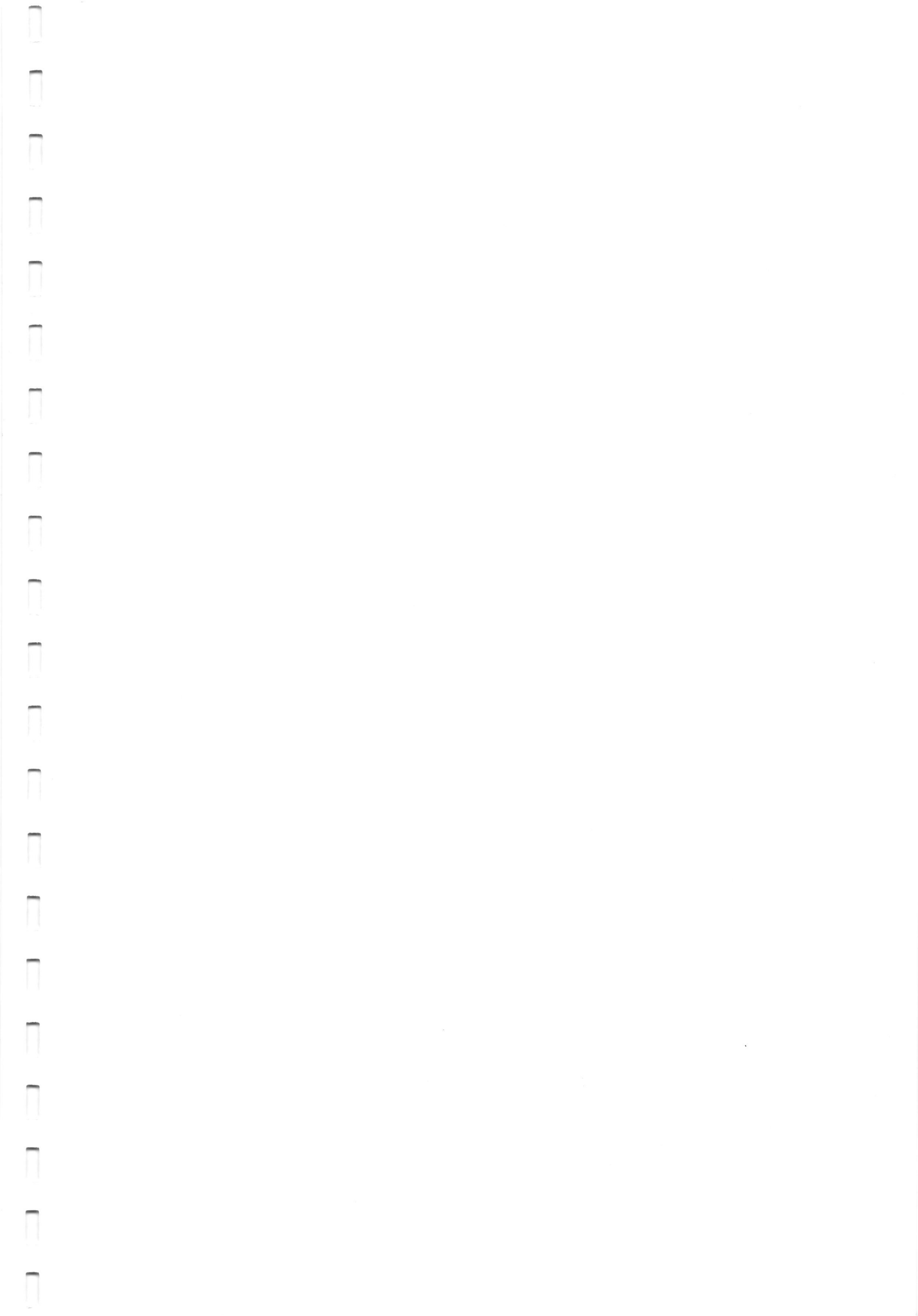
KATHMANDU UNIVERSITY
School of Science/ School of Engineering
End-Semester Examinations
March/ April, 2017

Examination Time : 11:00 A.M. to 2.00 P.M.

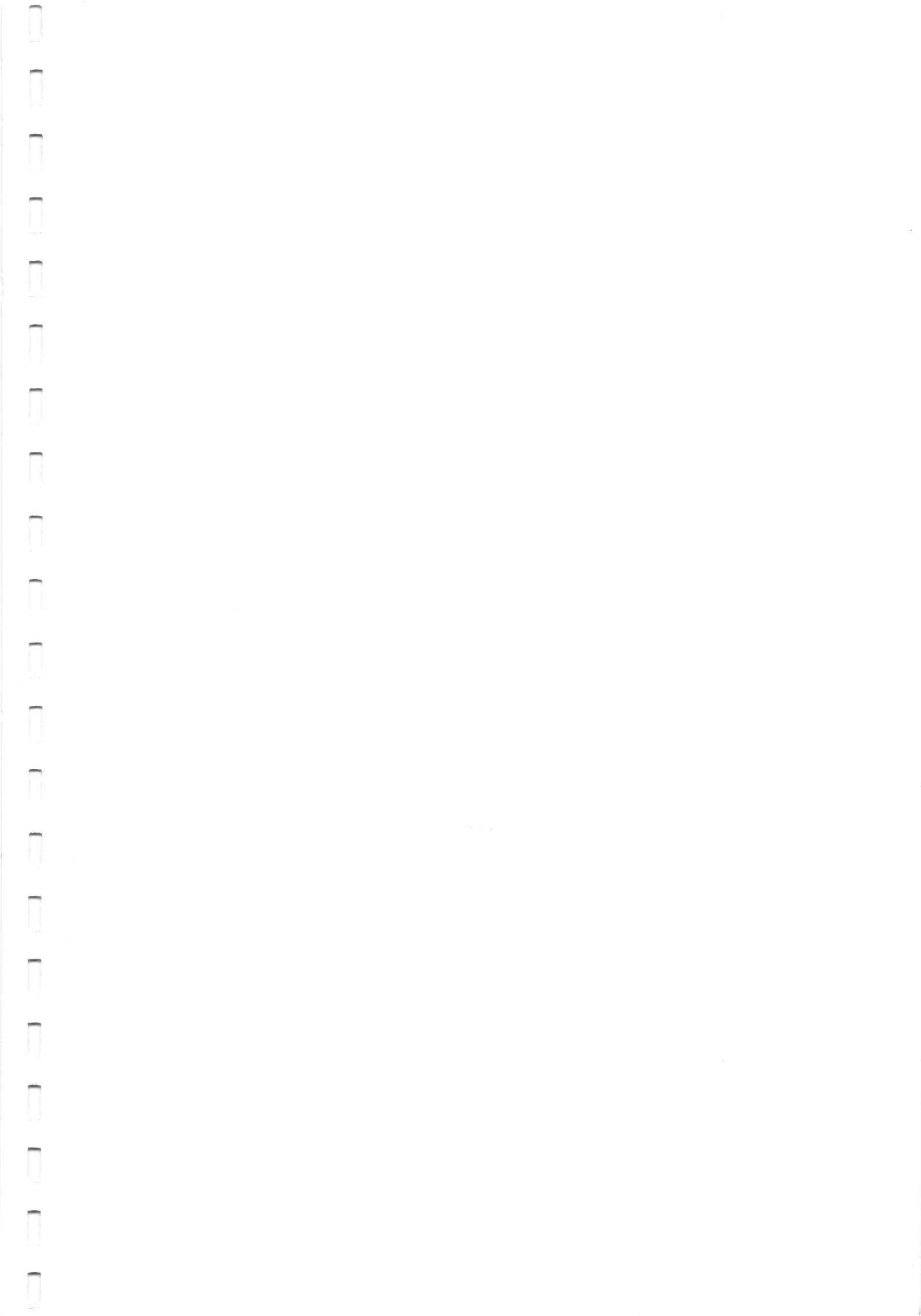
Date/ Day	I - I	I - II	II - I	II - II	III - I	IV - I
March 24 Friday			MATH 207 EE+ME+GE+ Civil++ENVE+ ChemE. MATH 206 ES+BP+HB BIOT 203 BT STAT 201 AP	MATH 207 CS	PHYS-312	MEPP 412 ME GEOM 401 GE CIEG 402 Civil MGTS 402 ES+ENVE+ BP BIOT 401 BT PHYS 401 AP
March 26 Sunday	PHYS 101 EE+ME+CE+ GE+Civil+CS +ES+ENVE+ BP+BT+ PHYS+Che.E. PHYS 113 HB	MATH 104 CS			EEEG 314 EE-C+EE-P MEEG 315 ME COMP 301 CE GEOM 316 GE CIEG 301 Civil INAN 301 ES+BP+BT+ ENVE PHYS 301 AP	ETEG 408 EE-C EPEG 413 EE-P COMP 401 CE+CS
March 27 Monday			EEEG 202 EE +CE+CS EEEG 204 ME+Chem.E. ENVS 211 ES+ENVE PHAR 216 BP MATH 205 GE+Civil BIOT 201 BT HBIO 201 HB MATH 201 AP	COMP 204 CS	COMP 317 CS	GEOM 402 GE CIEG 404 Civil ENVS 431 ES+ENVE PHAR 401 BP BIOT 410 BT PHYS 402 AP



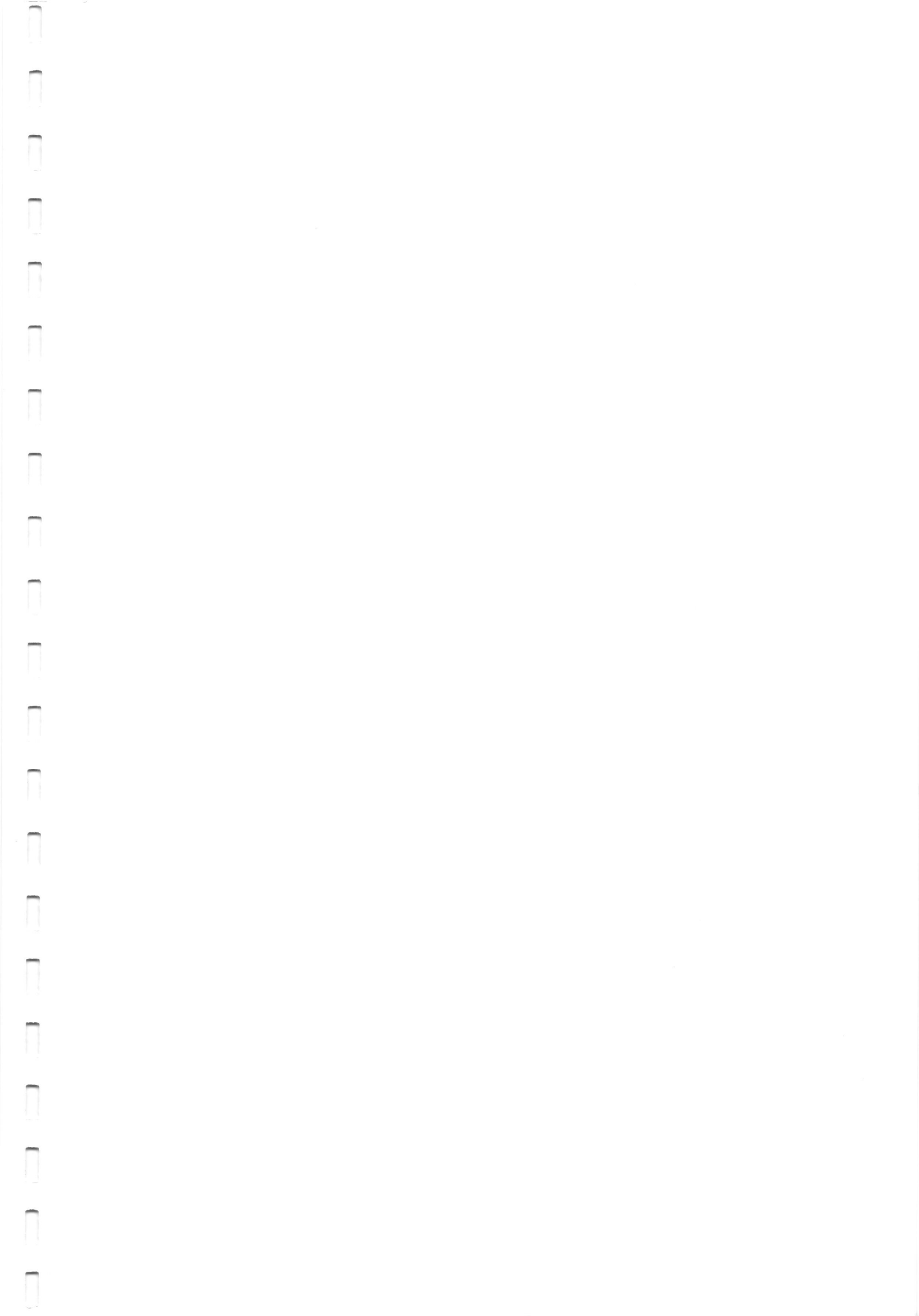
Date/ Day	I - I	I - II	II - I	II - II	III - I	IV - I
March 28 Tuesday	ENGT 101 EE+ME+CE+ GE+Civil+CS +ENVE+ES+ BP+BT+HB+ AP+ Che.E.				CIEG 306 Civil	
March 29 Wednesday		PHYS 102 CS			GEOM 317 GE ENVS 345 ES ENVE 309 ENVE PHAR 301 BP BIOT 303 BT MATH 301 AP	MGTS 403 EE+ME+CE+ CS
March 30 Thursday			EEEG 207 EE MEEG 213 ME+Chem. E. COMP 202 CE+CS CIEG 204 Civil Civil GEOM 205 GE CHEM 207 ES ENVE 209 ENVE PHAR 204 BP BIOT 204 BT CHEM 212 HB PHYS 202 AP		COEG 304 EE-C+ ME+CE EPEG 302 EE-P CIEG 302 Civil COMP 342 CS	GEOM 405 GE CIEG 406 Civil ENVS 423 ENVS 440 ES ENVE 432 ENVE PHAR 406 BP PHYS 405 AP



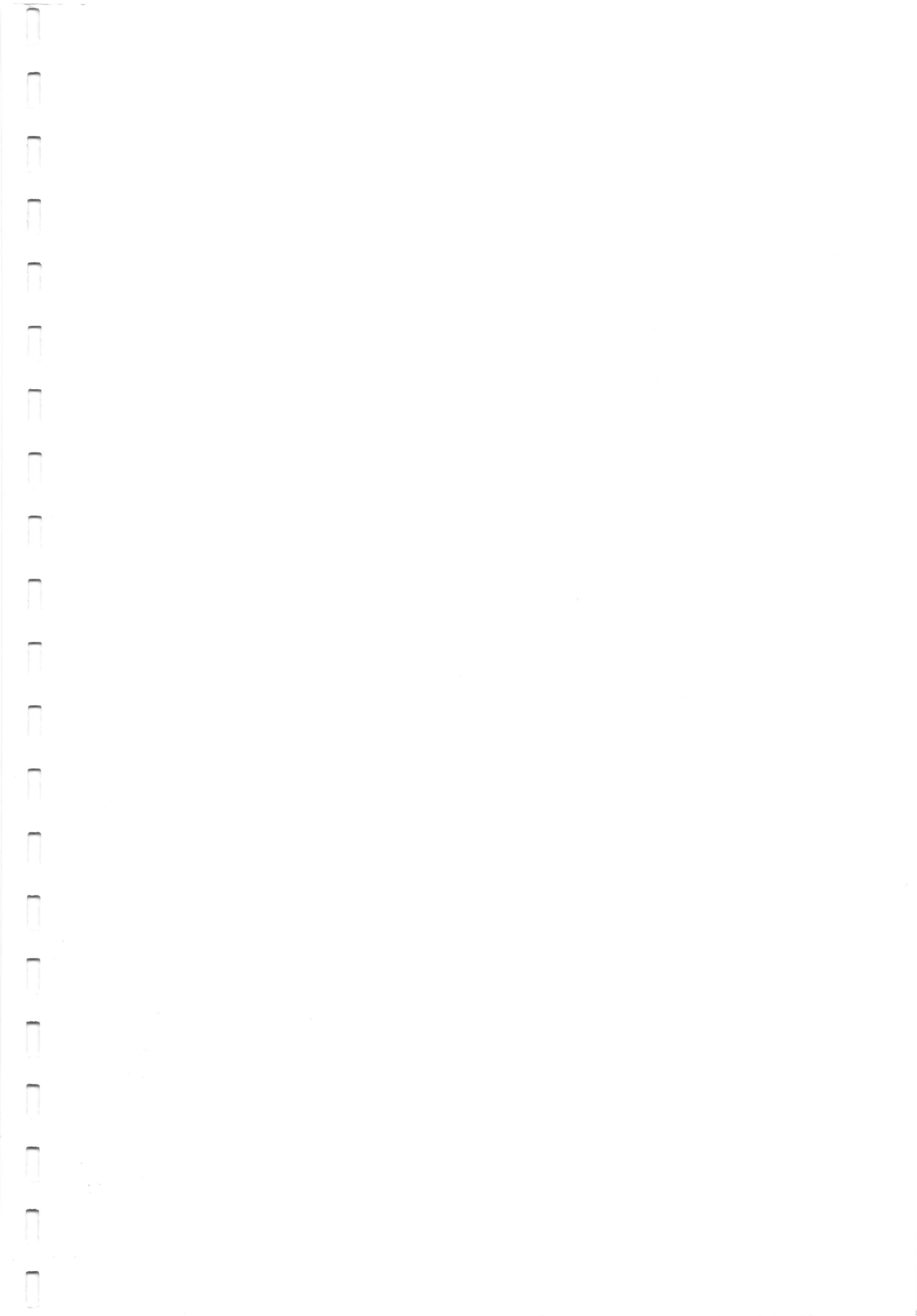
Date/ Day	I - I	I - II	II - I	II - II	III - I	IV - I
March 31 Friday	CHEM 101 EE+ME+CE+ GE+Civil+CS + ENVE+AP ES+BP+BT +HB+ Che.E.			MCSC 202 CS		BIOT 403 BT
April 2 Sunday		ENGG 112 CS	GEOM 201 GE MEEG 217 ME		MGTS 301 EE-C+EE- P+ME+CE+C S+ GE+Civil+EN VE+BP ENVS 338 ES BIOT 301 BT PHYS 303 AP	
April 3 Monday			EEEG 211 EE+CE+CS CIEG 201 Civil+ENVE ENVS 207 ES CHEM 201 BP+BT+HB+ Chem. E. PHYS 201 AP			ETEG 402 EE-C COEG 401 EE-P MEPP 427 ME COMP 472 CE+CS CIEG 405 GE+Civil ENVS 435 ES PHAR 408 BP ENVE 433 ENVE BIOT 409 BT PHYS 403 AP



Date/ Day	I - I	I - II	II - I	II - II	III - I	IV - I
April 4 Tuesday	MATH 101 EE+ME+CE+ GE+Civil+CS + ENVE+PHYS + Che.E. MATH 111 ES+BP+BT MATH 117 HB	ENVE 101 CS		COMP 231 CS		
April 6 Thursday		ENGT 102 CS	EEEG 213 EE MEEG 216 ME+ENVE+ Chem.E. CIEG 202 Civil GEOM 202 GE ENVS 212 ES PHAR 201 BP BIOT 202 BT HBIO 204 HB PHYS 203 AP		EEEG 313 EE-C+EE-P MEEG 301 ME COMP 315 CE+CS GEOM 303 GE CIEG 303 Civil ENVS 336 ES ENVE 207 ENVE PHAR 304 BP BIOT 302 BT MATH 302 AP	



Date/ Day	I - I	I - II	II - I	II - II	III - I	IV - I
April 7 Friday	ENGG 111 EE+ME+CE+ GE+Civil+CS +ENVE+ Che.E. BIOL 101 ES+BP+BT +HB+AP		MATH 208 CE+CS			ETEG 422 EE-C EPEG 422 EE-P COMP 421 CE+CS MEPP 433 MEPP 439 ME GEOM 409 GE CIEG 403 Civil ENVS 413 ES ENVS 404 ENVE PHAR 404 BP BIOT 404 BT PHYS 404 AP
April 9 Sunday	COMP 103 EE+ME+CE+ GE+Civil+ ENVE +CS+ Che.E. COMP 101 ES +BP+BT +AP	COMP 116 CS	ENVS 201 ES	COMP 232 CS	ETEG 302 EE-C EPEG 317 EE-P MEEG 306 ME COMP 307 CE+CS GEOM 318 GE CIEG 305 Civil+ENVE ENVS 332 ES PHAR 303 BP BIOT 304 BT PHYS 302 AP	



Date/ Day	I - I	I - II	II - I	II - II	III - I	IV - I
April 10 Monday	COMP 115 HB		MEEG 219 ME CIEG 203 Civil PHAR 203 BP MEEG 206 ENVE BIOT 205 BT MATH 204 AP CHEG 201 Chem. E.			ETEG 429 ETEG 431 EE-C EPEG 410 EPEG 416 EE-P MEPP 403 ME COMP 477 CE+CS CIEG 401 Civil GEOM 411 GE ENVS 402 ES+ENVE PHAR 402 BP BIOT 416 BT
April 11 Tuesday	HBIO 102 HB		MCSC 201 CE+CS PHYS 206 ES		ENVS 333 ES+ENVE	
April 13 Thursday			ENVE 204 ENVE		CIEG 304 CIVE MATH 303 AP	COMP 478 CE+CS CIEG 407 CIEG 408 CIEG 409 Civil GEOM 406 GE ENVS 415 ES
April 16 Sunday					COMP 316 CS	COMP 407 CE
April 19 Wednesday						COMP 409 CE

Note: Examinations will be conducted as per this schedule and under no circumstance the dates and times will be changed unless the University publishes prior notice.



