

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st year 2nd Semester Final Examination 2018
Subject: Introductory Computer Science (Theory)
Course Code: ICS-102 (T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. **Answer any five (5) questions** from each section. Use separate answer script for each section. **Split answer is strongly discouraged.**)

Section-A

1. a) Convert the following numbers into appropriate number system: 1x4= 4
(i) $(125.75)_{10} = (?)_2$
(ii) $(3A.DE)_{16} = (?)_8$
(iii) $(257)_8 = (?)_{10}$
(iv) $(1101.01111)_2 = (?)_8$
- b) Perform the following binary operations: 3
(i) $10010 - 11011$
(ii) $11110111 / 1001$
(iii) 111.011×11.01
2. a) Write down the characteristics of the following types of computer: 1.5x3=4.5
(i) Workstation (ii) Super computer (iii) Mainframe computer
- b) Write short notes on GUI. 2.5
3. a) How does laser printer work? 3
b) "Application software is mandatory to turn a computer system". Is the statement right or wrong? If wrong, what is the correct one? Justify. 1+2+1=4
4. a) Suppose, you set up a network to connect all digital devices in your city. What is the name of your designed network? Write down the properties of your designed network. 1+3= 4
b) Define mesh topology with advantages and disadvantages. 3
5. a) Define operating system (OS). Give some example of OS. Write down some major functions of OS. 3
b) Write down the characteristics of following types of OS: 2x2= 4
(i) Real time operating system
(ii) Multiuser and multitasking operating system
6. a) Define database management system (DBMS). Briefly explain some major operations of DBMS. 3
b) Write down some advantages and disadvantages of high level and low level language. 4

Section-B

7. a) Calculate the 1's and 2's complement of the following numbers: 1.5+1.5=3
(i) $(101101101)_2$
(ii) $(0110110101)_2$
- b) Construct truth table and logic gate of "OR" and "AND" gate using 3-inputs as x, y and z. 4
8. a) Briefly describe data and information. Which one is taken as input in computer system, data or information? Justify. 3
- b) Identify input and output devices from the following list: 4
Modem, printer, microphone, mouse, OMR, scanner, sound box, projector.
9. a) Define the properties of different transmission channels. 4
- b) "Generation of computer changed over the year". How is it occurring? 3
State your answer.
10. a) What is web browser? List some popular web browser. 3
- b) Write down the differences between ROM and RAM. 4
11. a) Define computer virus. Write down some harmful effects of computer virus. 4
- b) Write down the differences between compiler and interpreter. 3
12. a) How could you apply multimedia concepts to ease the teaching-learning system? 3
- b) Briefly describe the functions of 2+2=4
(i) ALU
(ii) CU

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st year 2nd Semester Final Examination, 2018
Course Title: Physical Chemistry (Theory)
Course Code: PCM-102

Full Marks: 70

Time: 3 hours

[Figures in the right margin indicate Full Marks. Answer any 4 (Four) questions from each section where question no. 1 & 6 are compulsory. Use separate answer scripts for each section. Split answer is strongly discouraged.]

SECTION-A

- | | | |
|----|---|-------|
| 1. | a) With examples define reversible reaction and chemical equilibrium. | 1+1=2 |
| | b) Explain the law of mass action. | 3 |
| 2. | a) What do you understand by equilibrium constant? | 2 |
| | b) Derive the relation between K_p and K_c . | 5 |
| | c) The value of K_p at 20°C for the reaction $2NO_{(g)} + Cl_{2(g)} \leftrightarrow 2NOCl_{(g)}$ is $1.9 \times 10^3 \text{ atm}^{-1}$. Calculate the value of K_c at the same temperature. | 3 |
| 3. | a) What are colligative properties? | 2 |
| | b) Derive an expression for determination of molecular mass from elevation of boiling point. | 4 |
| | c) The boiling point of a solution containing 0.20 g of a substance X in 20.0 g of ether is 0.17 K higher than that of pure ether. Calculate the molecular mass of X. Boiling point constant of ether per Kg is 2.16 K. | 4 |
| 4. | a) Is it possible to convert big size particles into colloidal particles? If yes, then justify your answer. | 2 |
| | b) Discuss the essential difference between lyophilic and lyophobic colloids. | 4 |
| | c) What are emulsions and gels? Explain the application of colloidal solutions in food industries. | 2+2=4 |
| 5. | a) What do you mean by elementary and complex reaction? | 2 |
| | b) Derive an expression for the rate constant of first order reaction. | 4 |
| | c) A first order reaction is 15% completed in 20 minutes. How long will it take to be 60% completed? | 4 |

SECTION-B

- | | | |
|----|---|------------|
| 6. | a) Define weight average molecular weight and number average molecular weight. | 2+2=4 |
| | b) Point out the limitations of Raoult's law. | 1 |
| 7. | a) What are exothermic and endothermic reactions? | 1+1=2 |
| | b) Discuss the factors that directly participate in changing the heat of a reaction. | 4 |
| | c) When a dilute solution of a strong acid is neutralized by a dilute solution of a strong base, the heat of neutralization is found to be nearly same in all cases. How do you account for this? | 4 |
| 8. | a) What are consecutive and parallel reactions? | 1+1=2 |
| | b) State and explain the transition state theory. | 4 |
| | c) Calculate the mole fraction of water, if 60 gm of glucose is dissolved in 50 ml water. Also calculate the boiling point of glucose solution if $K_p=0.5$. | 4 |
| 9. | a) What do you mean by ionic equilibrium and degree of ionization? | 1+1=2 |
| | b) Discuss about the Ostwald's dilution law. Enlist the limitations of this law. | 1+3=4 |
| | c) Explain the terms: solubility product and common ion effects. | 2+2=4 |
| 10 | a) Write short notes on the following: | 3.5+3.5+3= |
| | i) Electrical Double Layer | 10 |
| | ii) Activation Energy | |
| | iii) Zeta Potential | |

Chittagong Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 1st Year 2nd Semester Final Examination, 2018

Subject: Mathematics-II

Course Code: MTH-102(T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answer any Five (5) questions from each section.

Use separate answer script for each section. Split answer is strongly discouraged.)

Section A

1. a) Define differential equation, its order and degree. Give example of a linear and a non-linear differential equations. 1.5+1.5=3
- b) Obtain the differential equation by eliminating arbitrary constant of the equation $(x-a)^2 + y^2 = a^2$. 3+1=4
- Also write down the order of the differential equation obtained.
2. a) What do you understand by integrating factor? Why do you need this? Explain with example. 1+1=2
- b) Solve the following differential equations (any two). 2.5+2.5=5
- i) $(xy^2 + x)dx + (yx^2 + y)dy = 0$
- ii) $x \frac{dy}{dx} + y \log y = xye^x$
- iii) $(y^2e^{xy^2} + 4x^3)dx + (2xye^{xy^2} - 3y^2)dy = 0$
3. a) State Newton's law of cooling. An apple pie with an initial temperature of 170°C is removed from the oven and left to cool in a room with an air temperature of 20°C. Given that the temperature of the pie initially decreases at a rate of 3°C/min, how long will it take for the pie to cool to be a temperature of 30°C? 1+3=4
- b) A cell culture is growing exponentially with a doubling time of 3 hours. If there are 5000 cells initially, how long will it take for the cell culture to grow to 30000 cells? 3
4. a) Define Homogeneous Differential Equation. Does the equation $x^2dy + y(x+y)dx = 0$ homogeneous? 1
- b) Find the orthogonal family to the family of circles $x^2 + y^2 = 2cx$. 3
- c) Solve $\frac{d^2x}{dt^2} - 9x = 6t$ when $t = 0, x = 0$ & $\frac{dx}{dt} = 0$. 3
5. a) Determine whether the vectors are linearly independent or linearly dependent: $\vec{A} = 2\hat{i} + \hat{j} - 3\hat{k}, B = \hat{i} - 4\hat{k}, C = 4\hat{i} + 3\hat{j} - \hat{k}$. 3
- b) A particle moves along the curve $x = 2t^2, y = t^2 - 4t, z = -t - 5$, Where t is the time. Find the components of its velocity and acceleration at time $t = 1$ in the direction $\hat{i} - 2\hat{j} + 2\hat{k}$. 4
6. a) Define directional derivative and divergent of a vector function. In what direction from the point (2, 1, -1) is the directional derivative of $\phi = x^2yz^3$ a maximum? 1.5+1.5=3
- b) State Gauss Divergence theorem. 1+3=4
- Evaluate $\iint_S (3xi + 2yj) \cdot dA$ where S is the sphere $x^2 + y^2 + z^2 = 16$.

Section-B

7. a) Define different types of errors in numerical methods with examples. 2
 b) Mention the name of the numerical methods by which you can solve an algebraic or transcendental equation. 2
 c) Find a root of equation $x^3 - 4x - 9 = 0$ using bisection method in four stages. 3
8. a) What is extrapolation? 1
 b) Write down the Newton's formulas for interpolation. 2
 c) Estimate the missing term in the following table 4

x	1	2	3	4	5
$f(x)$	2	9	28	?	126

9. a) Write down Newton's Forward and Backward ~~divided~~ difference formula. 1
 b) Construct the difference table from the following data and use it to find the cubic polynomial which takes the following values $y(0)=1$, $y(1)=0$, $y(2)=1$ and $y(3) = 10$. Hence or otherwise, obtain $y(4)$. 6

10. a) Discuss Trapezoidal Rule for finding an approximate area under a given curve. 3
 b) A Solid of revolution is formed by rotating about the x-axis, the area between the x-axis, the lines $x = 0$ and $x = 1$ and a curve through the points with the co-ordinates 4

x	0	0.25	0.5	0.75	1
y	1	0.9896	0.9589	0.9089	0.8415

Estimate the volume of the solid formed, giving the answer to three decimal places.

11. a) Define Periodic function, even function and odd function with example. 3
 b) Obtain the Fourier series for the periodic function 4

$$f(x) = \begin{cases} 0 & -\pi < x < 0 \\ x & 0 < x < \pi \end{cases}$$

12. Show that the Sine series for the function $f(x) = e^x$, $0 < x < \pi$ is 7

$$\frac{2}{\pi} \sum_{n=1}^{\infty} n \left[\frac{1 - (-1)^n}{n^2 + 1} e^{\pi} \right] \sin n\pi$$

Chittagong Veterinary and Animal Sciences University

Faculty of Food Science and Technology

BFST 1st year 2nd Semester Final Examination 2018

Subject: Biochemistry (Theory)

Course Code: BCM-102 (T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. Answer any Three (3) questions from each section of which question number 1 and 5 are compulsory. Use separate answer script for each section. Split answer is strongly discouraged.)

Section-A

1. a) Define Biochemistry. How will you differentiate between Chemistry and Biochemistry? 1+3=4
b) Write down the scope of Biochemistry. How do you co-relate it with other sciences? 2+2=4
c) Draw a structure of hexose sugar and show anomeric, asymmetric and penultimate carbon. 3
2. a) What is carbohydrate? How will you classify it? 1+2=3
b) What is metabolism? Write down the classification of metabolism. 1+2=3
c) Define glycolysis. What are the differences between glycolysis and fermentation? 1+2=3
d) What are the fates of pyruvate in aerobic and anaerobic glycolysis? 3
3. a) Define the following terms: 0.5×6=3
Codon, Transcription, T_m , Annealing, Tautomerism, Epimer
b) What are nucleotides? Write down the structure of P^A , P^C , P^G and P^T . 1+2=3
c) Compare and contrast between DNA and RNA in relation to their base composition, site of location and function. 3
d) A human cell contains 21% of Thymine of its DNA content. Calculate the mole % of adenine, guanine and cytosine. 3
4. a) Give a piece of evidence that DNA carries the genetic information. 3
b) Define translation. Describe protein biosynthesis in Eukaryotic cell? 1+4=5
c) Define β -oxidation. Write down the activation stage of fatty acid during β -oxidation in cytosol. Calculate energetics of a mole of Palmitic acid oxidation. 1+3=4

Section-B

5. a) Give the structural formula of α , D (+) glucopyranose. What do α , D and (+) mean? 1+1=2
b) Give two points of difference between 2+2=4
i) lactose and maltose ii) starch and cellulose.
c) What is inversion? Why is it so called? 1+1=2
d) Write *short notes* on the following: 1×3=3
i) Glycoprotein ii) Cholesterol iii) Zwitterion.
6. a) Enumerate the metabolic processes of carbohydrates. What is the common metabolic end product of carbohydrates, proteins and lipids that enter into TCA cycle? 3+1=4
b) Differentiate between deamination and decarboxylation with examples. How do the metabolic waste products of both processes eliminated from the body? 3+3=6
c) Write down the names of specialized product(s) formed from the following amino acids. 0.5×4=2
Glycine, Thryptophan, Glutamate and lysine.
7. a) Define Lipid. Classify lipid with examples. 1+3=4
b) What is fatty acid? Write down the structure of PUFA with their biological importance. 1+3=4
c) Match the followings: 0.25×8=4
Heparin, Sucrose, Cholesterol, ω 6 series fatty acid, Steroids, Oxytocin, Trypsin, Peptide bond

Versus

Neutral lipids, Linolenic acid, CPP, Natural anticoagulant, Table sugar, Proteolytic enzymes, Covalent bond, Contraction of uterus

8. a) What is enzyme? Write down importance of enzymes. 1+3=3
b) Describe the different types of specificity of enzymes. 5
c) Discuss the effects of P^H and temperature on the rate of an enzyme catalyzed reaction. 4

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st year 2nd Semester Final Examination 2018
Subject: Fundamentals of Food Engineering (Theory)
Course Code: FFE-102 (T)

Full Marks: 70

Time: 3 hours

(Figures in the right margin indicate full marks. **Answer any four (4) questions** from each section of which question number **1** and **6** are compulsory. Use separate answer script for each section. **Split answer is strongly discouraged.**)

Section-A

- | | | | |
|----|----|--|-----------|
| 1. | a) | What do you mean by Food Engineering and Food Technology? | 2 |
| | b) | Organize the sequence of unit operations in food processing from delivery of raw materials to distribution of finished products. | 3 |
| 2. | a) | How spoilage of food may occur? | 2 |
| | b) | Why commercial preservation of food is necessary? | 2 |
| | c) | Classify food on the basis of p^H and source. | 3 |
| | d) | Discuss the factors affecting heat penetration in canned food. | 3 |
| 3. | a) | Generalized the steps of canning process with flow chart. | 6 |
| | b) | Define boiler. Classify boilers on the basis of different characteristics. | 1+3=4 |
| 4. | a) | Briefly describe the contact equilibrium process with examples. | 4 |
| | b) | Illustrate different types of distillation system with their use in the industry. | 6 |
| 5. | a) | "Elements in raw materials impact finished food products quality"-give your opinion on the statement. | 2.5 |
| | b) | Write short notes on: (i) Hammer mill,
(ii) Homogenization,
(iii) Pasteurization. | 2.5x3=7.5 |

Section-B

- | | | | |
|-----|--|--|-------|
| 6. | What do you mean by process suitability? How size and shape of the raw material are affecting the process suitability? | 2+3=5 | |
| 7. | a) | Illustrate the functional properties of food raw materials. | 4 |
| | b) | Explain the disadvantages of wet cleaning? How can you increase the efficiency of soaking and spray washing? | 3+3=6 |
| 8. | a) | Illustrate decimal reduction time and thermal death time. | 4 |
| | b) | Define head space. What your recommendation to prevent spoilage of canned food? | 1+5=6 |
| 9. | a) | How plastic materials can affects our health in packaging of food? | 3 |
| | b) | Enumerate the characteristics of an ideal container. | 2 |
| | c) | Illustrate the fabrication step of tin can. | 5 |
| 10. | a) | Explain the importance of size sorting. Describe the fixed aperture screens. | 1+4=5 |
| | b) | How can you increase your boiler efficiency? | 2 |
| | c) | Explain the thermal processing for food sterilization and preservation. | 3 |

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 1st year 2nd Semester Final Examination, 2018
Course Title: Physics-II (Theory)
Course Code: PHC-102

Full Marks: 70

Time: 3 hours

[Figures in the right margin indicate Full Marks. Answer any **5 (Five)** questions from each section. Use separate answer scripts for each section. **Split answer is strongly discouraged.**]

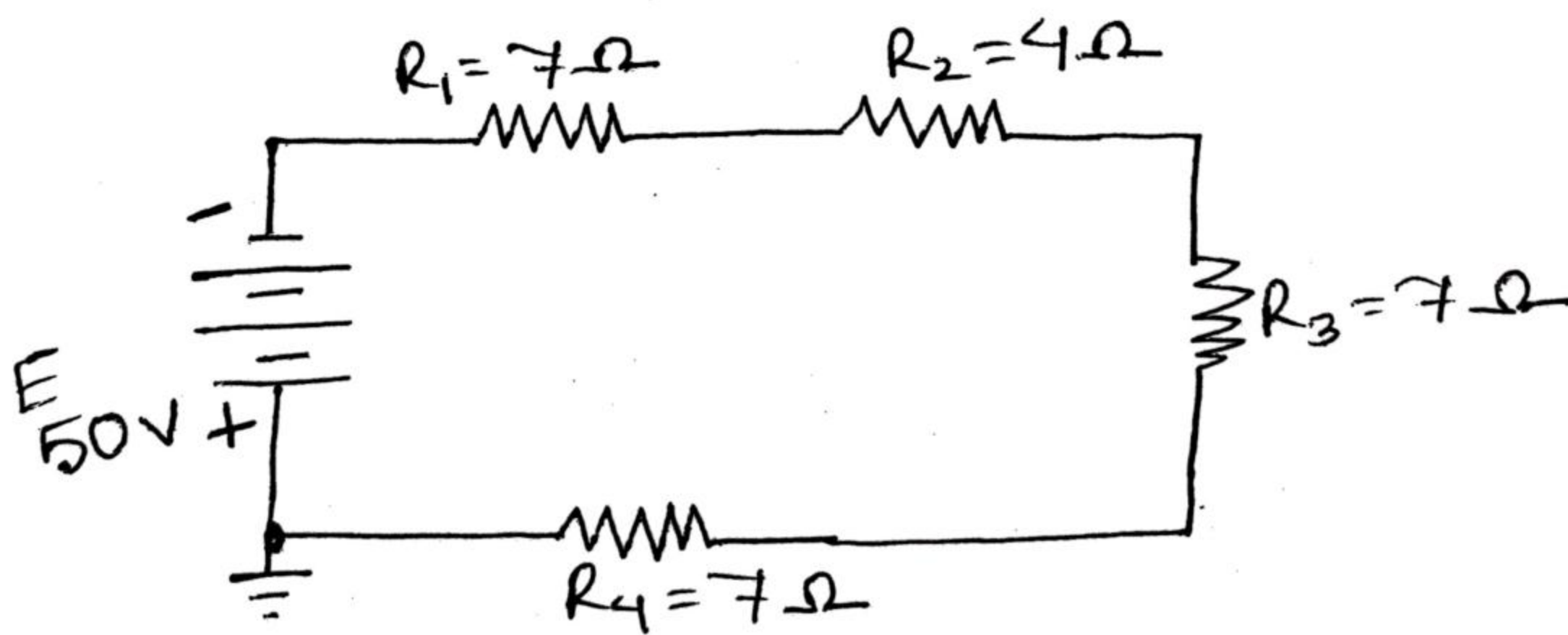
SECTION-A

1. a) Explain the salient features of Bohr's atomic model. 3
 b) Illustrate the concept of secondary emission and photo electric emission. 2+2=4

2. a) Define permeability, susceptibility. 1
 b) What is meant by a semiconductor? Discuss some important properties of semiconductors. 1+2=3
 c) Draw and explain the V-I characteristics of a p-n junction. 3

3. a) Classify semiconductors. Explain the formation of p-type semiconductor. 1+2=3
 b) Is it possible to increase or decrease potential barrier of a p-n junction? Support your answer with necessary explanations. 4

4. a) What is rectification? Explain the function of full wave bridge rectifier. 1+3=4
 b) A full-wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at 20Ω . The transformer r.m.s. secondary voltage from center tap to each end of secondary is $50V$ and load resistance is 980Ω . Find:
 i) the mean load current
 ii) the r.m.s. value of load current. 3

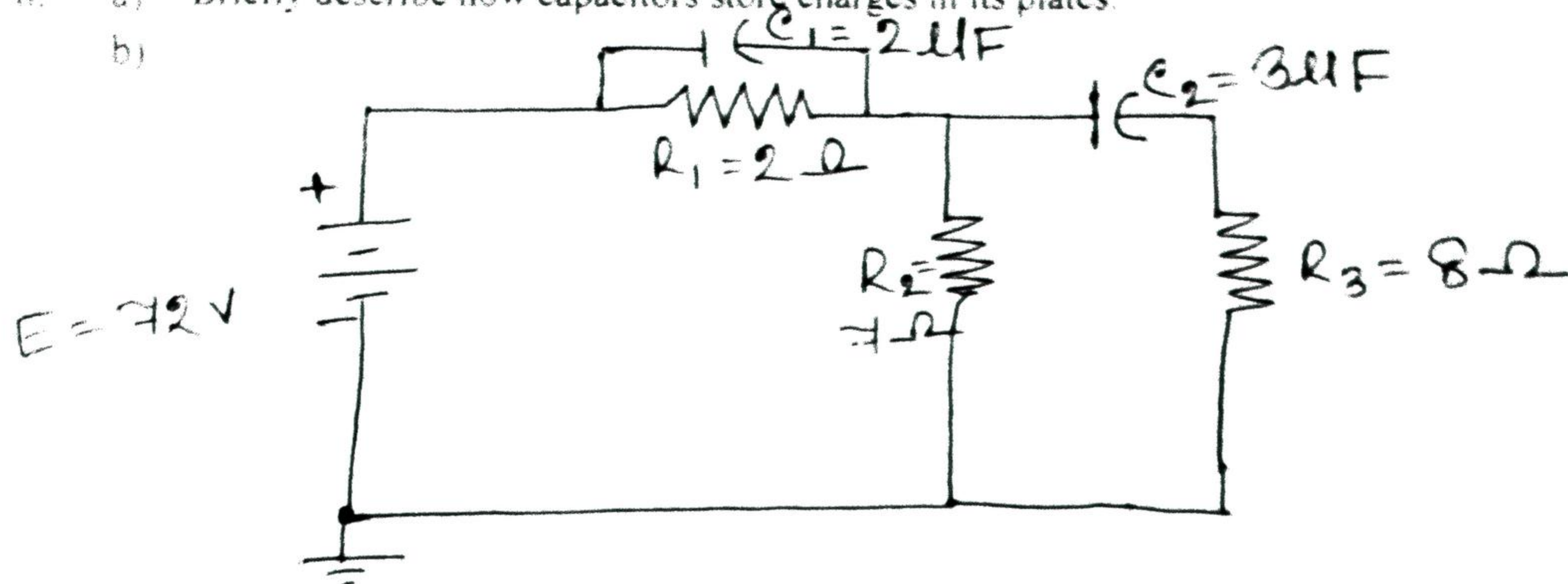
5. a) 4


- For the circuit shown in the fig
 i) Find the total resistance R_T
 ii) Determine the source current I_S and indicate its direction on the circuit.
 iii) Find the voltage across resistor R_2 and indicate its polarity on the circuit.
- b) Write short note on: open circuit, short circuit, transistor. 3

6. a) State and explain Ohm's law with proper circuit diagram. 2
 b) Connect two voltage sources first in series and then in parallel. What will be the output in each case? 3
 c) Three capacitors of value $5mF$, $2mF$ and $3\mu F$ are connected in series. What is the total capacitance of the circuit? 2

SECTION-B

7. a) Explain the transients occur in a capacitive network during its charging and discharging phase. 7
8. a) Briefly describe how capacitors store charges in its plates. 3
b) 4



For the circuit shown in fig, find the voltage across and the charge on each capacitor of the network after each has charged up to its final value.

9. a) Prove that, the induction of an inductor with a ferromagnetic core is μ_r times the inductance obtained with an air core. 4
b) State and explain Faraday's law of electromagnetic induction. 3
10. a) Describe young's experiment with proper figure. 4
b) Green light of wave length 5100\AA from a narrow slit is incident on a double slit. If the overall separation of 10 fringes on a screen 20 cm away is 2cm find the slit separation. 3
11. a) Establish the relation between half life and mean life. 4
b) Write some applications of radioactivity. 2
c) Write the general properties of radioactive radiations. 1
12. a) Give the structural details of nuclear reactor. 5
b) What is fission and fusion? 2