Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2ⁿᵈ year 1ˢᵗ Semester Final Examination,
2016
Subject: Technology of Food Preservation (Theory)
Course Code: TFP-201

Full Marks: 70   **Time: 3 hours**

(Figures in the right margin indicate full marks. **Answer any four (4) questions** from each section where **Question no. 1 and 6 are compulsory**. Use separate answer script for each section. Split answer is discouraged.)

Section-A

1.   Explain the statement "Rheology and texture of food has a substantial influence on consumer perception of quality".   5

2.   a)   Define ripening. Explain the post-harvest changes that are associated with fruits and vegetables.   5
     b)   How can you calculate the specific heat of food? Gives with an example.   2
     c)   Enumerate the different treatments to control the post-harvest decay of fresh produce with examples.   3

3.   a)   Write down the BET equation with its assumption.   3
     b)   Show distinction between dehydration and drying.   3
     c)   Illustrate the advantages of counter flow over con current flow in a tunnel dryer? –Explain with figure.   4

4.   a)   Denote some principles of chemical preservation of foods.   3
     b)   Discuss the commonly used food preservatives and safety aspects.   3
     c)   What are the natural preservatives? How can they preserve the foods- explain. 4

5.   a)   Justify the low temperature techniques as food preservation.   3
     b)   Establish refrigeration requirements to freeze foods.   3
     c)   What are the factors to be considered in connection with chilling storage? – Briefly describe with example.   4

Section-B

6.   Define quality of foods. What are the advantages of control of food quality by law? Discuss the specific responsibility of a quality controller in an industry in brief.   5

7.   a)   Enumerate the instruments used to measure the rheological properties with assumption. Establish relationship between shear stress and pressure required to force the fluid through capillary tube.   6
     b)   A dry food product with bulk density of 45 lbm/ft³ is stored in a large storage Container and is removed by gravity through a 4 in diameter opening in the bottom of the container. The test for angle of repose gave a mound of product with 4 in diameter and 3 in height. Compute the rate at which the product will be released from the container. (Discharge Co-efficient =0.65)   4

8.   a)   Categories the quality characteristic of a product. Explain the sensory characteristics.   6
     b)   Define food texture. Describe the response of a food product to cyclic force application.   4

9.   a)   What do you mean by ionizing radiation? Briefly describe the scope of irradiation. Enumerate the extent of doses and their purposes.   6
     b)   Discuss the effect of irradiation on microorganism and food components.   4

10. Write short notes on the following tropics: i) IMF,   2.5x4=10
                          ii) Angle of repose and angle of friction,
                          iii) Rehydration coefficient,
                          iv) Cryogenic freezing.

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination, 2016
Course Title: General Microbiology (Theory)
Course Code: GMC-201(T)

Full Marks: 70   **Time: 3 hours**

(Figures in the right margin indicate full marks. Answer **three** questions from each section where question no. **1** and **5** are compulsory. Use separate answer script for each section. Split answer is discouraged.)

SECTION-A

1. a) Describe the functions of bacterial cell wall.   2
    b) Differentiate between prokaryotic and eukaryotic cell.   6
    c) Classify bacteria on the basis of flagellar distribution.   3

2. a) Illustrate the replication process of DNA in bacteria.   6
    b) Describe point mutation and deletion mutation.   2
    c) Describe bacterial mating where genetic material is transferred through sex pili.   4

3. a) Write down the general characteristics of Virus and Chlamydia.   4
    b) How do viruses resemble cells and how do they differ from cells? Classify virus on the basis of their   5
        capsid architecture.
    c) List the important molds and yeasts of industrial importance.   3

4. a) What do you mean by pathogenicity, virulence and virulence factor?   2
    b) Describe some tissue degrading bacterial enzymes.   4
    c) Compare exotoxin and endotoxin.   6

SECTION-B

5. a) Define bacterial growth. Draw and label the typical growth curve of bacteria.   3
    b) Describe the structures and functions of the prokaryotic plasma membrane and capsule.   5
    c) Give a nutritional classification of organisms.   3

6. a) List the essential nutrients of a bacterial cell. Briefly describe the essential factors influencing the   8
        growth of microorganisms.
    b) Define metabolism. Enumerate the pathways of carbohydrate metabolism.   4

7. a) What is fungi imperfecti? Enumerate the criteria usually used for the identification of molds.   5
    b) Name five mycotoxins along with the toxigenic fungi.   4
    c) Write down the asexual spores produced by fungi.   3

8. a) Define the following terms: sterilization, disinfection, thermal death point (TDP), and thermal death   4
        time (TDT).
    b) Briefly describe the physical methods used to control microbial growth.   8

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 discouraged.)

Section-A

1. a) Define hazard. Write down the hazard profile of Bangladesh.   4
   b) State the causes of natural disasters.   3

2. a) List the logistic support or facilities for cooked food distribution.   4
   b) How could you ensure the fair delivery during a relief distribution program?   3

3. a) What is the difference between "onsite food ration" and "take home ration" in a supplementary food distribution?   4
   b) Differentiate between nutritional survey and surveillance.   3

4. a) Define nutritional relief. Why it is important?   3
   b) State the storage and transportation system of relief product.   4

5. a) Shortly discuss targeted supplementary feeding program.   4
   b) What are the criteria of therapeutic feeding program?   3

6. a) What is nutritional disorder? What are the causes of malnutrition?   4
   b) What are the differences between marasmus and kwashiorkor?   3

Section-B

7. a) Which nutrients are responsible for the following signs -   5
   i) Thin hair   ii) Angular stomatitis and cheilosis   iii) Bitot's spot
   iv)Follicular hyperkeratosis   v) Spoon shape nail and brittle
   b) "Biochemical method is not possible to carry out easily"- Why?   2

8. a) Justify "Gender discrimination affects nutritional status".   3
   b) Write down the food taboos and consequences regarding food intake.   4

9. a) What are the differences between osteoporosis and osteomalacia?   3
   b) What do you know about food supplementation? Discuss the types of food supplements.   4

10. a) What is a nutritional message? What criteria needed for good messages?   3
    b) Illustrate the communication strategies in nutrition education.   4

11. a) Define chronic energy deficiency. What are the elements of nutrition education?   3
    b) How will you distinguish between 24 hrs recall method and food frequency questionnaire method?   4

12. Define indicator. What types of nutrition indices are used to identify nutritional status of an individual?   7

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination, 2016
Subject: Organic Chemistry (Theory)
Course Code: OCM-201

Full Marks: 70   Time: 3 hours

(Figures in the right margin indicate full marks. **Answer any four (4) questions** from each section where **Question no. 1 and 6 are compulsory.** Use separate answer script for each section. **Split answer is not allowed.**)

Section-A

1. a) Explain why alkanes are relatively unreactive?   2
    b) How will you distinguish between an alkene and an alkane?   3

2. a) How could you synthesize benzene from (i) Alkynes (ii) Decarboxylation of aromatic   4
       acids?
    b) Discuss the mechanism of sulphonation of benzene.   3
    c) Complete the following reactions   3

    i)   [benzene] + CH_3COCl $\xrightarrow{AlCl_3}$

    ii)   [benzene] + $CH_2=CH_2$ $\xrightarrow{AlCl_3, 90^\circ C}$

    iii) [benzene] + Cl_2 $\xrightarrow{UV\ light}$

3. a) How are aldehydes prepared? Discuss their important reactions.   5
    b) State the tests of aldehydes and ketones.   3
    c) Write short notes on "The Clemmensen reduction".   2

4. a) What are phenols and how do they differ structurally from aromatic alcohols?   2
    b) Describe the following methods of preparation of phenol: 4
       i) Alkali fusion of sodium arensulphonates
       ii) Decarboxylation of phenolic acids.
    c) State the following reactions with reference to phenol.   4
       i) Gattermann Reaction
       ii) Reimer Tiemann Reaction

5. a) Describe the following methods of preparation of ethers: 6
       i) Dehydration of alcohols.
       ii) Passing alcohol vapours over alumina
       iii) Williamson Ether Synthesis.
    b) Write down the oxidation reaction of alcohols.   2
    c) Give some uses of ether.   2

Section-B

6. a) How will you synthesis n-butylamine from n-propyl chloride?   3
    b) How will you synthesis ethylamine from methylamine?   2

7. a) Write the three general preparation of carboxylic acid.   3
    b) Complete the following reactions   3
       i) $R-CH_2COOH + Br_2$ $\xrightarrow{P}$
       ii) $R-CH_2COOH$ $\xrightarrow{P_2O_5}$
       iii) $R-CH_2COOH$ $\xrightarrow{LiAlH_4}$
    c) Explain why formic is stronger than acetic acid.   2
    d) Write test for carboxylic acid group .   2

8. a) Discuss the basicity of amines.   3
    b) What is sulphonylation of amines? Describe in details Hinsberg test for finding whether a   5
       given amine is 1°, 2° or 3°.
    c) How would you get primary amine from amide?   2

9. a) What are aldehydes and ketones? Point out the structural relationship between the two   3
       types of compounds.

    b) How will you synthesize: 4
       i)   Acetone cyanohydrin from aceton
       ii) Acetaldehyde diethyl acetal from acetaldehyde
       iii) Ethane from acetaldehyde
       iv) Formaldehyde from acetaldehyde

    c) Write a note on: "Aldol Condensation".   3

10. a) Give two methods of preparation of alkanes.   4

    b) Write all possible structural isomers of the alkane C_5H_{12}. Name each isomer by common   3
       and IUPAC system.

    c) How does ethylene reacts with: 3
       i) Cl_2
       ii) Conc. H_2SO_4
       iii) O_3, Zn/H_2O_2

Subject: Unit operations in Food Processing (Theory)

Course Code: UFP-201

Full Marks: 70   **Time: 3 hours**

(Figures in the right margin indicate full marks. **Answer any four (4) questions** from each section where **Question no. 1 and 6 are compulsory**. Use separate answer script for each section. Split answer is discouraged.)

Section-A

1.   Define internal energy and external energy. "Materials and balances are fundamental to the control of food processing"- Discuss about it.   5

2.   a)   Write down semi theoretical drying equation and prove empirical equation from fick`s law.   5

    b)   If 35000 Kg of whole milk containing 4% fat is to be separated in a 6 hours period into skim milk with 0.45% fat and cream with 45% fat, what are the flow rates of two output streams from a continuous centrifuge which accomplish the separators?   5

3.   a)   Derive the principles of fixed bed drying and explain the fixed bed drying system.   5

    b)   A tunnel drier is used to dry a product from 80% m.c. (db) to 4% m.c. (db). The total drying time is 2 hrs. The product moves through the dryer by 5 ft x 5ft trays, which are carried on with 20 trays per cart .Each tray contains 50 lbm. Determine the average out/ capacity if the tunnel length is 30 ft.   5

4.   a)   How you can measure the optimum moisture content for dried foods?   4

    b)   Why water activity is more important than total moisture content of a food during preservation?   2

    c)   Define hygroscopic and hygroemissive product. Explain water activity and other deteriorative reactions in dried foods.   4

5.   a)   Show the arrangement of freeze drying process and explain its working mechanism.   5

    b)   Define log-mean temp. Find out the value of K (Permeability of water with respect to vapour transport) of freeze drying process, when quantity of water removed=200 gm., time of drying =5 hr., vapour pressure at $47^{o}C$=82 mm of Hg. Total pressure in the freeze drying chamber =0.16 mm of Hg and the thickness of dried product =2 cm.   5

Section-B

6.   a)   How does freezer burn affect product quality during preservations?   2

    b)   Shortly describe the forms of water occur in food.   3

7.   a)   Explain the following equipment's: i)Air blast freezer,   6
                                           ii) Plate freezer,
                                           iii) Immersion freezer.

    b)   A block of lean beef is being frozen in a -20° F convective freezer (hc=5 btu/ hr ft^{2o}F). The initial temperature is $40^{o}F$ and the dimensions are 30 in by 10 in by 25 in. Compute the time required to freeze the product to $15^{o}F$.   4

        Assume, Product density 66 lbm/ft^{3},
                 Thermal conductivity 0.64 btu/ hr ft^{o}F,
                 Freezing temperature, T_{F}=28.85 ^{o}F ,
                 Latent heat=107.3 btu/lbm
                 And (P=0.29 & R=0.082).

8.   a)   Illustrate the material and enthalpy balance on forward feed triple effect evaporator.   5

    b)   Determine the surface area necessary for heat transfer in the evaporator. Where stream temperature 250° F and product temperature 150° F.   5
         Assume, Ws=29000 lbm/hr,
                 Hs= 1200 btu/lbm,
                 Hc=220 btu/lbm and
                 U=300 btu/hr ft^{2o}F

9. a) Mention the names of different Heat exchanger and explain about Plate heat exchanger.　　3
    exchanger.

    b) Derive the mathematical expression for conduction modes of heat transfer.　　3

    c) A wall has an overall heat transfer co-efficient of 1.5 kcal/m.hr.°C . The inside　　4
    air temperature is -30°C. The sun conductance's are hi=7.5 kcal/m² hr° C and
    ho=30 kcal/m² hr°C. Find out inside and outside wall temperature.

10.　　Write short note on (any four):　　2.5x4=10
        i) Freezing point depression,
        ii) Cabinet dryer,
        iii) Refrigerant,
        iv) Overall heat transfer coefficient,
        v) Critical moisture content.

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2016
Subject: Basic Electrical and Electronic Engineering
Course Code: EEE-201(T)

Full Marks: 70 **Time: 3 hours**

(Figures in the right margin indicate full marks. Answer **Four (4)** questions from each section where question no. 1 and 6 are compulsory. Use separate answer script for each section. Split answer is discouraged.)

Section-A

1. a) What do you mean by Unilateral and Bilateral element of an electrical network? 2
   b) What do you mean by the terms "Current source" and "Voltage source"? Draw the V-I characteristics of a current source and voltage source to identify the ideal and practical behaviors. 3

2. a) Explain with neat diagram how a potential barrier formed in a p-n junction. 4
   b) What happen when we apply forward and reverse voltage across a p-n junction? Explain. 4
   c) Define majority carriers with figure. 2

3. a) What do you mean by Crystalline and Amorphous solids? Mention different crystal systems with their unit cell characteristics. 5
   b) What do you mean by "Atomic Packing Factor"? Calculate atomic packing factor for simple cubic, body centered cubic and face centered cubic structure. 3
   c) Calculate the no of atoms per unit cell of a metal having lattice parameter 2.9 Å and density 7.87 gm./cc. Atomic weight of the metal is 55.85 gm. and Avogadro's number is 6.023×10^{23} atoms/mol. 2

4. a) State Thevenin's theorem and justify this theorem for a relevant network. 5
   b) Find the unknown node voltages at points V_1, V_2 and V_3 using Supernodal analysis: 5
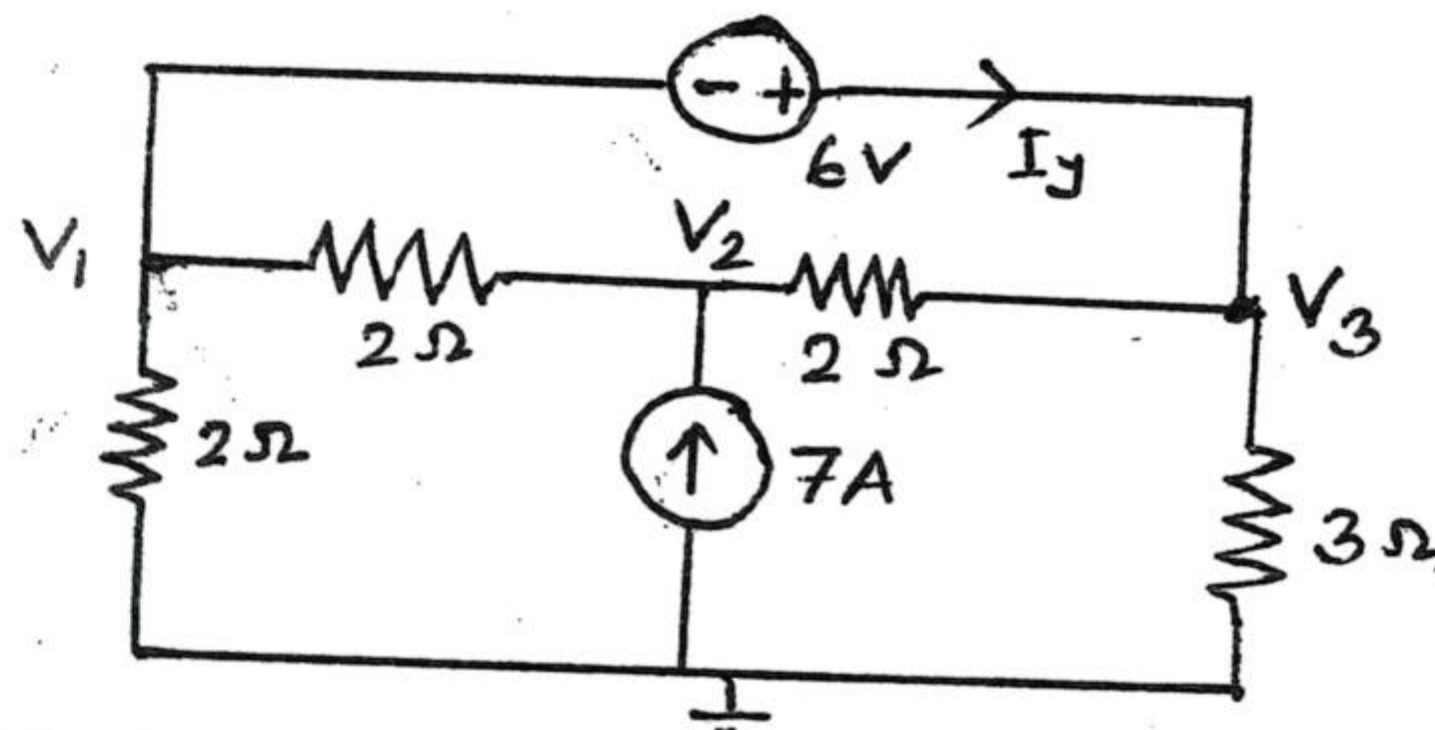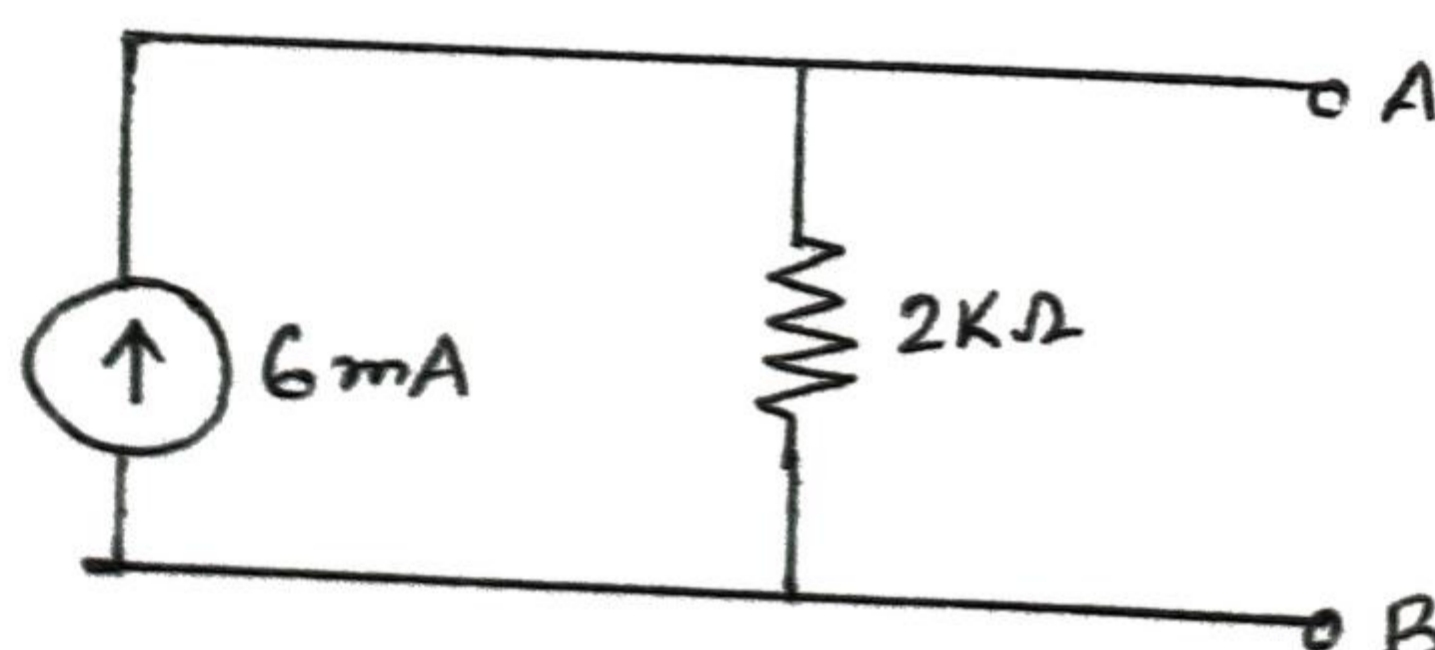

5. a) State and Proof Maximum Power Transfer theorem and hence proof that the maximum power transfer efficiency of a network is 50%. 5
   b) Find the value of R_L for maximum power transfer and the maximum power that can be transferred in the network shown below: 5
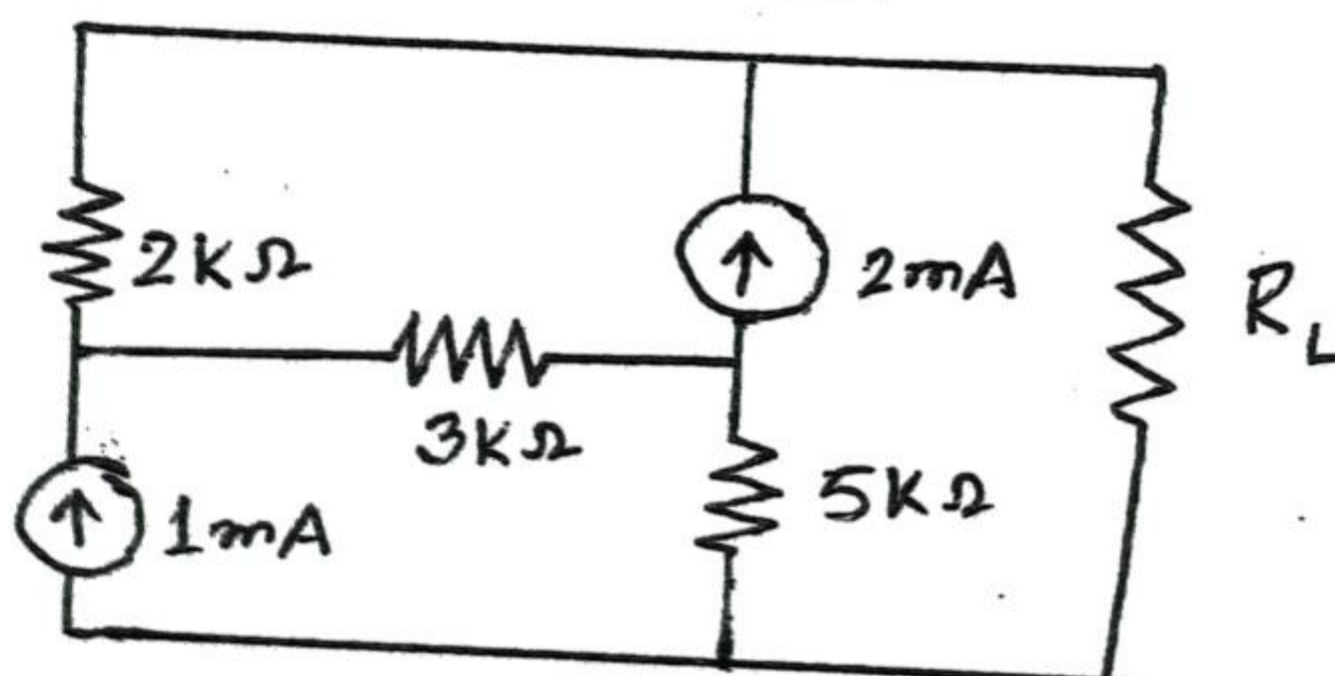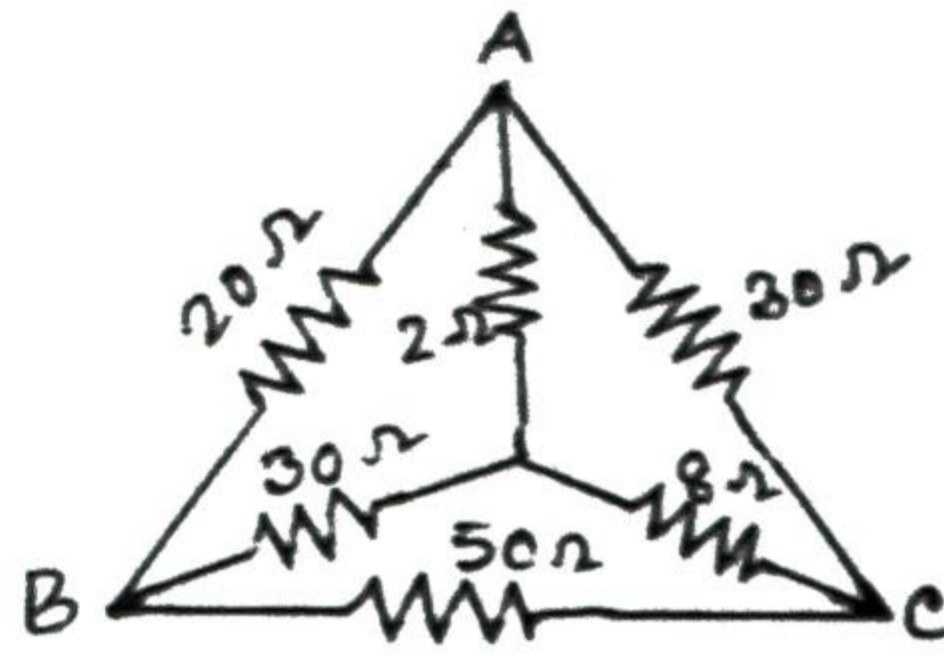

Section-B

6. a) Convert the constant current source below into equivalent voltage source. 2

b) Find the resistance value between A and B; B and C; C and A of the network shown: 3


7. a) Establish a relationship between R. M. S. voltage and Peak voltage for an AC generator. 3

b) State and explain Ohm's law for both electrical and magnetic circuits. 2

c) Draw the hysteresis loop for ferromagnetic materials to explain the terms magnetic saturation, retentivity and Coercivity. 5

8. a) Determine the voltage $V_C(t)$ in the RC circuit using AC analysis. Assuming $V_S(t) = V_{peak}Cos\omega t$. 4
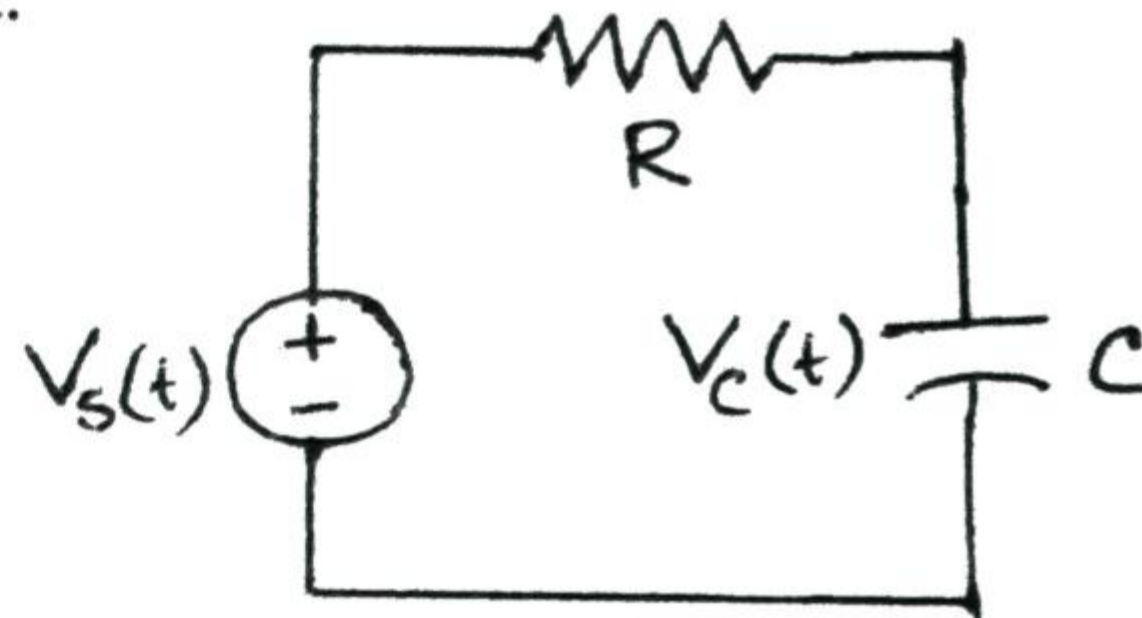
b) Find the current through 2Ω resistor and hence verify the reciprocity theorem. 6
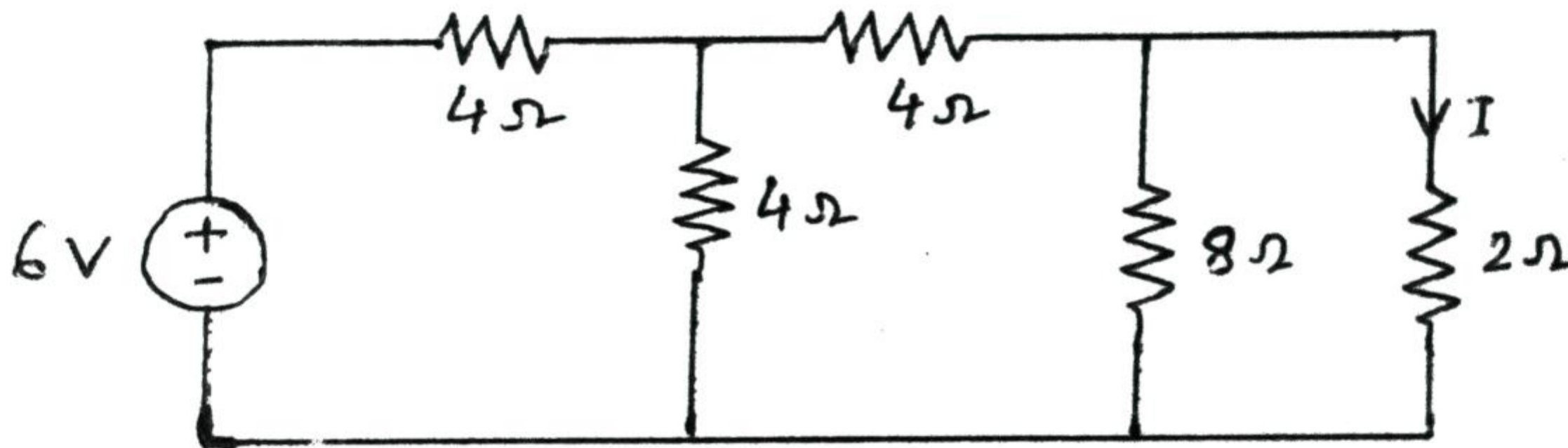
9. a) Derive an expression for the e. m. f equation of a transformer. Give the structural concept of step-up and step-down transformer on the basis of the equation. 4

b) Draw the common emitter configuration of pnp and npn transistor with symbol and proper identification of current. 4

c) What is the difference between JFET and bipolar transistor? 2

10. a) Find i_0 in the network shown using Superposition theorem. 5
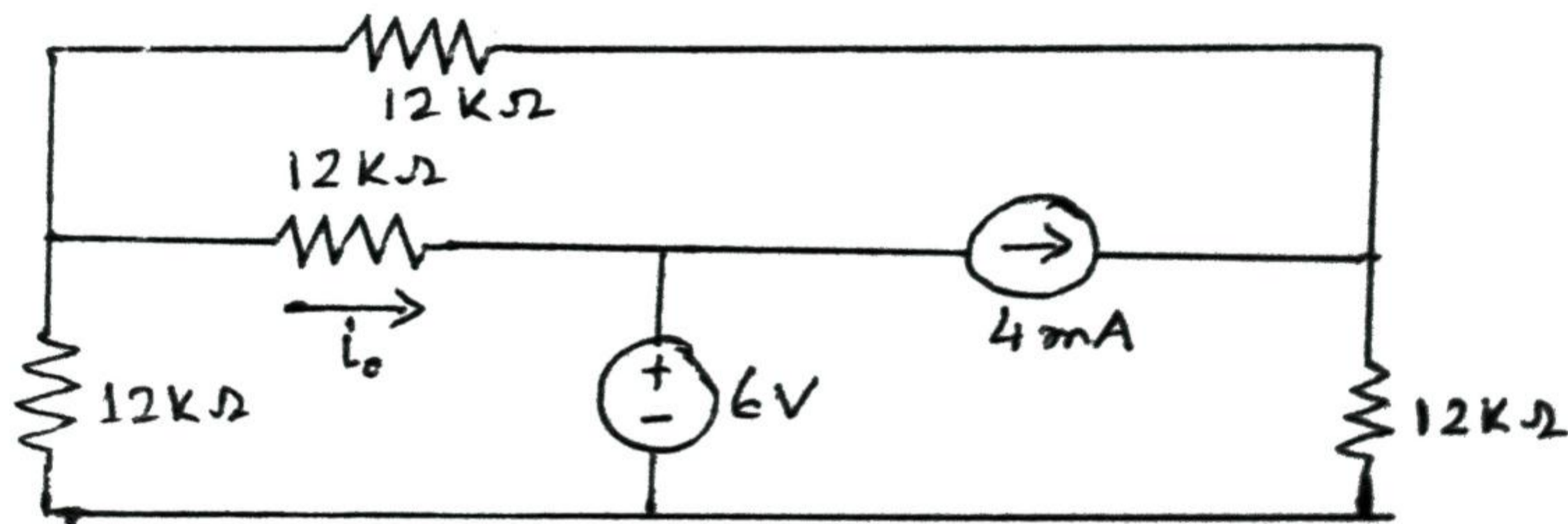
b) Obtain the node voltages V_1 and V_2 of the circuit diagram below using nodal analysis: 5