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

(Figures in the right margin indicate full marks. Answer **4** questions from each section. 1 & 6
Questions are compulsory. Use separate answer script for each section. Split answer is not allowed.)

Section-A

1. How will you synthesize the following compounds from benzene?   5
    a) Chlorobenzene b) Nitrobenzene c) Toluene d) Acetophenone e) Benzenehexachloride
    (Gammexane)

2. a) How will you synthesize formaldehyde from acetaldehyde?   3
    b) Write a note on: Cannizzaro reaction.   3
    c) Write the point of difference of aldehydes and ketones.   4

3. a) How will you distinguish between alkane and alkene?   2
    b) What is Markonikownikov's rule? In presence of peroxide why does Markonikownikov's   4
        rule not exist?
    c) Draw all the possible structural isomers of C_5H_{10} which contain a double bond (there are   4
        five in total). Label the isomers A-E.
        i)   Identify two molecules which are positional isomers.
        ii) Identify two molecules which are chain isomers.
        iii) Identify one molecule which shows stereoisomerism.
        iv) Draw the structure of a molecule which is a functional isomer of all the
             molecules A to E

4. a) Which one is stronger acid and why?   2
        i) CH_3COOH ii) $ClCH_2COOH$
    b) Why –COOH group is a meta directing substituent?   2
    c) Carboxylic acid gives nucleophilic substitution reactions whereas carbonyl group gives   2
        nucleophilic addition reactions, explain.
    d) Write a reaction for the laboratory preparation of i) aliphatic carboxylic acid ii) aromatic   2
        carboxylic acid.
    e) Identify each of the following compounds: 2
        i) An acidic compound that also has properties of an aldehyde; its molecular
           formula is CH_2O_2.
        ii) A compound used as a preservative for biological specimens and as a raw
            material for plastic.

5. a) How is ethyl alcohol manufactured?   5
    b) What will happen (Only reaction)?   5
        i)   Ethanol reacts with conc. H_2SO_4 at 140°C
        ii) Ethanol reacts with PCl_5
        iii) Ethanol reacts with Sodium
        iv) Sodium methoxide reacts with methyl iodide
        v)   Ethanol reacts with acetyl chloride

Section-B

6. a) Draw the structure of Dettol.   2
    b) Write the uses of phenol.   3

7. a) Describe the preparations of acetaldehyde. Give its properties and how it reacts with   6
        ammonia and hydrogen cyanide?
    b) State the tests of aldehydes and ketones.   2
    c) Explain why aldehydes are more reactive than ketones.   2

8. a) Discuss the structure of benzene.   6
    b) Explain why benzene undergoes electrophilic substitution reactions whereas alkenes   2
        undergo addition reactions.
    c) Write a note on: Friedel-Craft reaction.   2

9. a) How is phenol obtained from coal tar? Give a modern synthetic method for the preparation of phenol from a petroleum source. 5

   b) Phenols are acidic in character while alcohols are almost neutral. Explain in detail. 2

   c) How does phenols react with: 3
      i) Zn dust/ heat
      ii) Bromine water
      iii) Nitric acid

10. a) Discuss the action of nitrous acids on primary, secondary and tertiary amines. 5

    b) Identify (A), (B) and (C) in the following reaction sequence: 3

    $$CH_3CH_2OH \xrightarrow{\quad SOCl_2 \quad} (A) \xrightarrow{\quad NaCN \quad} (B) \xrightarrow{\quad LiAlH_4 \quad} (C)$$

    c) How will you synthesize methylamine from ethylamine? 3

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination, 2015
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 **four (4)** questions from each section. Use separate answer script for each section. Question no 1 & 6 are compulsory. Split answer is discouraged.)

Section-A

1. a) Define Food Preservation. Do you think that food processing and food preservation are the same? Put arguments in favor of your answer.   5

2. a) Indicate the relationship between shear stress and pressure required to force the fluid through a capillary tube.   4
    b) Develop an expression for stress by Maxwell to obtain the elastic and viscous properties of solid food products.   3
    c) Evaluate the generalized Reynolds number for an apricot puree flowing through a pipe with a 1in diameter at a mean velocity of 2.5 ft/sec. Where density of apricot puree 65 lbm/ft^3 and product properties: m=200 dyne.sec/cm^2 and n=0.3.   3

3. a) Explain Viscosity and Consistency of foods. Describe principles of measurements of viscosity of foods.   5
    b) Mention the Kinesthetic qualities of foods. What are the various physical and chemical methods used for evaluation of kinesthetic properties of foods?   5

4. a) Find out the functions of chemical additives in food preservation.   2
    b) Briefly describe the indirect effect of irradiation. How this can be limited? 4
    c) Give the major components of double seam of tin cans with dimensions and figure. 4

5. a) Write short notes on the following terms: i) Drip loss, ii) Fortification, iii) Freezer burn, iv) Food additives, v) Thermal runway.   2x5=10

Section-B

6. a) How can you control insects and mites from grain storage rooms?   5

7. a) Give a brief outline of tunnel drying system for dehydrating fruits and vegetables. 3
    b) Write down the basic principles of dehydration.   3
    c) A tunnel dryer is being use to dry a high moisture food product with 65% moisture content (dry basis) to a moisture content of 4%. The product pieces are in the shape of a brick with 1 in thickness and 1 in width and a 2 in length. The products move through the dryer is 5 ft x 5 ft tray while the trays are carried on carts with 20 trays per cart. Each tray contains 50 lbm of product with dry density of 40 lbm/ft^3 and an equilibrium moisture content of 3%. Total drying times required 0.58 hr. Determine the average feed rate and production rate through the dryer, if the tunnel length is 15 ft.   4

8. a) Enumerate in brief the freezing effect in foods and on microorganism.   7
    b) Compute the size of critical –sized ice nuclei formed when water is super cooled 2°C. 3

9. a) Briefly describe the storage system of plant products.   4
    b) What types of treatment can be used to delay the onset of spoilage of fresh plant product? 2
    c) Systematically illustrate the interrelations among the grain bulk organism and their abiotic environment in the spoilage of stored grain.   4

10. a) Define food concentration. Briefly discuss the methods for food concentrations. 4
    b) How to test the reconstitution ability of dried food products?   2
    c) The weight of dried sample is 10g which contained 5% moisture. The drained weight of rehydrate sample is 70g. If the fresh sample contained 90% moisture before drying, Calculate Rehydration ratio, Rehydration Co-efficient and Co-efficient of Rehydration of that foods.   4

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination, 2015
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 **four** (4) questions from each section. Use separate answer script for each section. Question no 1 & 6 are compulsory. Split answer is discouraged.)

Section-A

1.   List down the various guidelines required for material and energy balance. How you   5
        can measure the optimum moisture content for dried foods?

2. a) Explain the principles and theory of thin layer drying with limitation.   5
    b) Skim milk is prepared by removal of some of the fat from whole milk. This skim milk   5
        is found to contain 90.5 % water, 3.5 % protein, 5.1% carbohydrate, 0.1% fat and 0.8
        % ash. If the original milk contained 4.5% fat. Calculate its composition assuming
        that fat only was removed to make the skim milk and that there are no losses in the
        processing.

3. a) Derive the usuable form of the first order kinetic equation.   5
    b) A drum dryer is being designed for drying of a product from an initial total solid   5
        content of 12% to moisture content of 4%. An overall heat transfer co-efficient (U) of
        300 btu/ft^{2}°F is being estimated for the product. An average temperature difference
        between the roller surface and the product of 150°F will be used for design purpose.
        Determine the surface area of the roller required to provide a production of 50 lbm
        product/hr and latent heat 1000 btu/lbm.

4. a) Why do we see more new refrigerated foods entering the market place than other   4
        foods? How freezing affects foods?
    b) Define equilibrium moisture content. Enumerate in brief the arrangement and   6
        methods of freeze drying.

5. a) Derive planks equation for determining freezing time.   6
    b) Determine the freezing time of whole chicken which is being frozen from 40°F to (-   4
        20°F). Assume, latent heat (l) =120btu/lbm,
                  density (ρ) = 58 lbm/cft,
                  Dia (a) = 0.5ft,
                  hc= 5 btu/hr.ft^{2}.°F,
                  K= 1.2 btu/hr.ft.°F.

Section-B

6. a) List the basic factors which affect the rate of evaporation. Discuss the advantages of   5
        multiple-effect-Evaporation.

7. a) Explain in brief the following terms; i) Triple point of water, ii) Refrigerant and iii) 5
        freezer burn.
    b) Orange juice with 10% total solids is being concentrated in a single effect evaporator   5
        using a feed rate of 30,000 lbm/hr at 70°F. The evaporator is being operated at a
        vacuum which will allow the product to boil at 159°F, while steam is being supplied
        at 30 lbf/in^{2}. Absolute pressure. The desired concentration in the product is 50% total
        solids. Compute the steam requirements and steam economy of the process.
        Assume: C_{PF}=0.914 Btu/ lbm°F
                  C_{PP}=0.8 Btu/lbm°F,
                  C_{PC}=1 Btu/lbm°F,
                  H_S=1164.1 Btu/lbm,
                  H_V=1130 Btu/ lbm.

8. a) Differentiate between Overall heat transfer co-efficient and thermal conductivity.   4
    b) Define Steam Economy. A tubular heat exchanger is being designed for honey. The   6
        equipment will have 2 in diameter and 10 ft. length. If the heat exchanger is operated
        at 1000 lbm/min. Compute the film heat transfer co-efficient. Assume: K= 0.26 btu/
        hr.ft.°F and C_P=0.6 btu/lbm°F.

9. a) Illustrate the forms of water occur in foods. Define water activity and equilibrium   4
        relative humidity.

    b) "Desorption isotherm usually lies above the Adsorption isotherm"- Explain the   6
        statement. Show the relationship between Free moisture and Equilibrium moisture
        content in drying process.

10. a) Write short notes on the following terms: i) Immersion Freezing,   5x2=10
                                                 ii) Votator,
                                                 iii) Internal energy,
                                                 iv) Diffusion co-efficient,
                                                 v) Freezing point depression.

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1ˢᵗ Semester Final Examination, 2015
Subject: General Microbiology (Theory)
Course Code: GMC-201

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

(Figures in the right margin indicate full marks. Answer **three (3)** questions from each section where question no. **1 & 5** are compulsory. Use separate answer script for each section. Split answer is discouraged.

SECTION-A

1	a)	Differentiate gram positive and gram negative bacteria on the basis of cell wall.	5
	b)	Classify bacteria on the basis of cellular morphology.	3
	c)	Describe the process of sporulation.	3
2.	a)	Describe a standard bacterial growth curve.	5
	b)	Explain phenol co-efficient of a disinfectant.	3
	c)	Mention the characteristics of an ideal disinfectant.	4
3.	a)	Classify bacteriological media on the basis of their purposes.	4
	b)	Differentiate fungi from bacteria.	4
	c)	Classify fungus on the basis of their sexual reproduction.	4
4	a)	Define genome, codon and anticodon.	3
	b)	Describe the mechanism of DNA replication.	4
	c)	Compare and contrast DNA & RNA of bacteria.	5

SECTION-B

5	a)	Write down the characteristics of the exo- and endotoxins product by bacteria.	6
	b)	Write down the chemical composition and functions of the outer membrane in gram-negative bacteria. Name the chemical composition of capsule, cytoplasimic membrane and pili of bacteria.	5
6	a)	Describe the major contributions of Antony von Leeuwenhoek, Louis Pasteur and Robert Koch & Frau Hesse to the development of Microbiology.	7
	b)	Define protist. Draw a bacterial cell and label all important components.	5
7.	a)	What is the role of ATP in coupling reaction in the metabolism?	2
	b)	Define fermentation. Mention some industrial uses of different types of fermentation.	5
	c)	What is mycotoxin ? Write down the characteristics of mycotoxin .	5
8.	a)	List the general characteristics of mycoplasma and rickettsia.	4
	b)	What is virion? Briefly describe the viral structure.	6
	c)	Mention five viruses that have potential to be transmitted via food.	2

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination, 2015
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 Active and Passive element of an electrical network?   2
   b) Obtain the equivalent resistance at the terminals a-b of the circuit shown using   3
      $Y - \Delta$ or $\Delta - Y$ transformation.
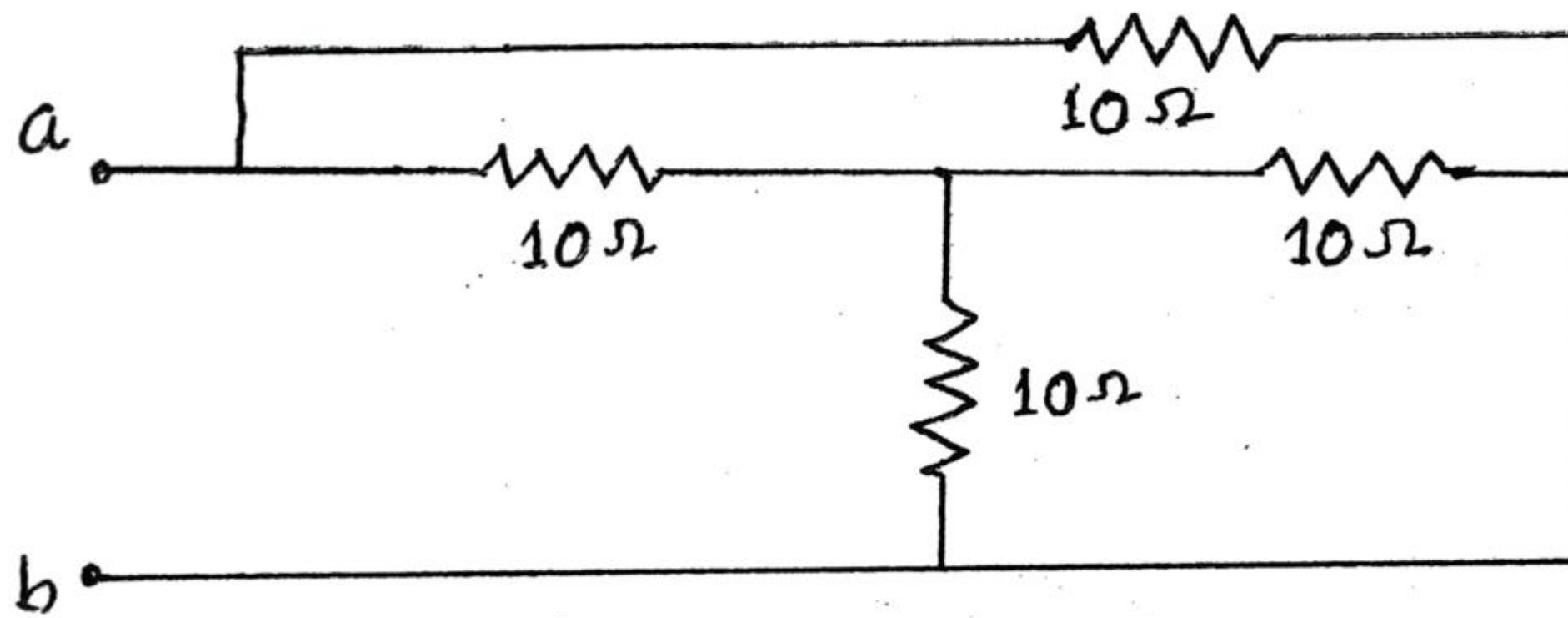
2. a) What is the basic difference between energy band and energy level? Distinguish   4
      between conductors, semiconductors and insulators in terms of energy band
      diagram.
   b) What do you mean by the term 'Atomic packing factor'? Calculate atomic packing   4
      factor for simple cubic, body centered cubic and face centered cubic structure.
   c) Find the density of molybdenum having B.C.C. structure from the following data: 2
      Atomic weight $=95.94$ gm/mol; lattice constant $= 3.148$ $A°$; Avogadro's number =
      6.023×10^{23} atoms/mol

3. a) What is meant by impedance of an AC circuit? Show that the reactance has the   5
      same dimension as that of resistance.

   b) Obtain the mesh currents I_1, I_2 and I_3 of the circuit diagram below using supermesh   5
   analysis.
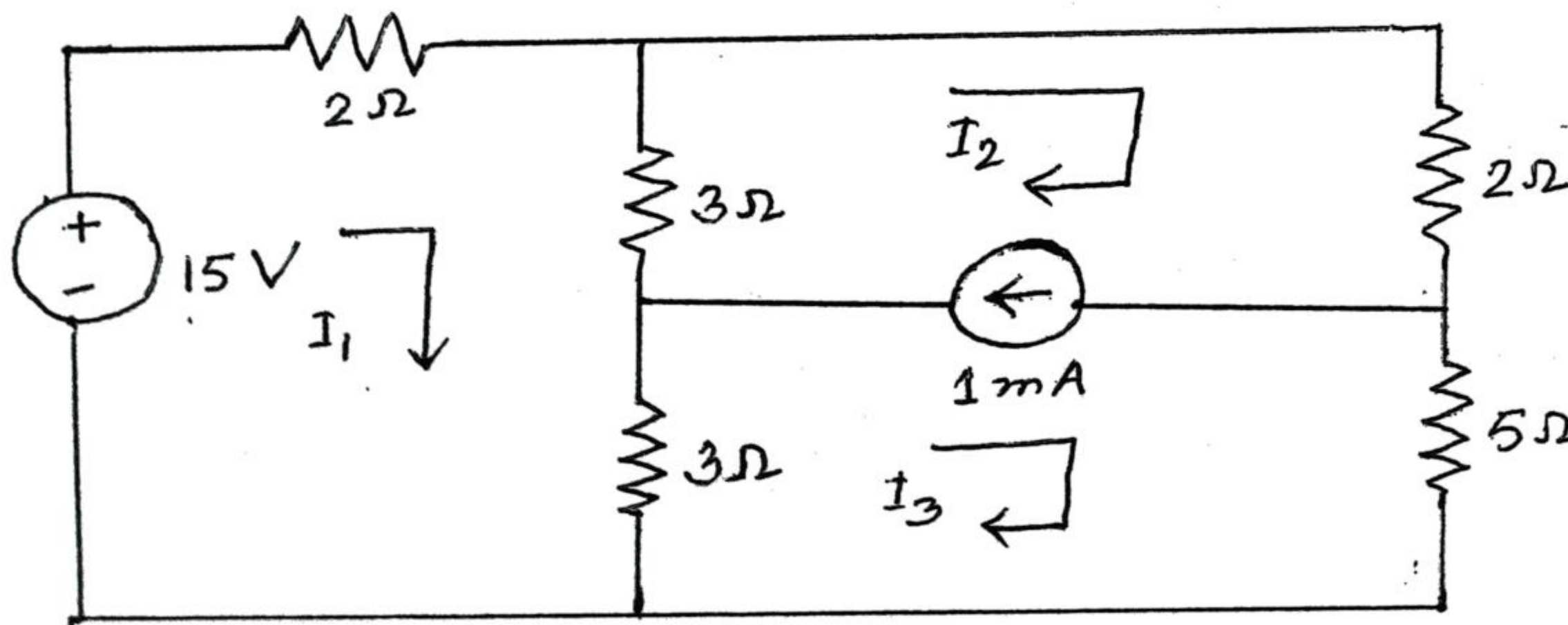
4. a) State and explain superposition theorem. Discuss the limitation(s) of Thevenin's   6
      theorem and Norton's theorem, if any.
   b) Derive an expression for power factor in AC circuit analysis and hence define real   4
      power and apparent power.

5. a) What do you mean by the concept of 'Hole current '? Explain the mechanism of the   4
      hole current flow through a semiconductor.
   b) Describe the brief V-I characteristics curve of p-n junction. How does a p-n   4
      junction diode work as a rectifier?
   c) Draw the energy diagram for n-type and p-type semiconductors.   2

Section-B

6.   Derive the equations used to transform three terminal networks from Y-configuration to Δ- configuration or vice versa.   **5**

7. 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.   **5**

   b)   Convert the constant voltage source shown in figure below into constant current source.   **3**
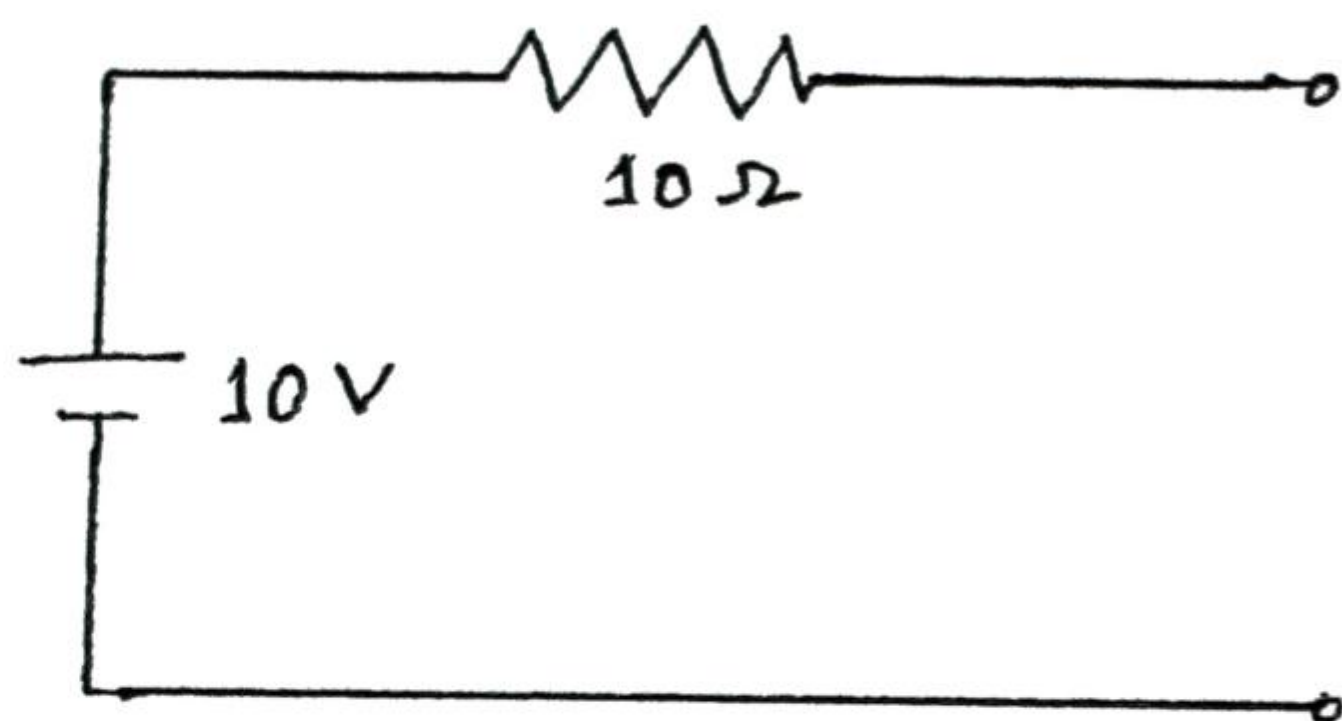

   c)   Draw the Hysteresis loop for ferromagnetic materials to explain the terms magnetic saturation, retentivity and coercivity.   **2**

8. a)   Explain constant voltage and current sources. What is their utility?   **5**

   b)   Derive the condition for transfer of maximum power from a source to a load.   **3**

   c)   A dry battery developing 12V has an internal resistance of 10Ω. Find the output current if load is i) 100Ω.   ii) 1Ω.   **2**

9. a)   Establish a relationship between the peak and root mean square value of voltage for AC generator using simple electrical circuit   **4**

   b)   Determine the currents $\vec{I_1}$, $\vec{I_2}$ and $\vec{I_3}$ in the circuit below using AC circuit analysis:
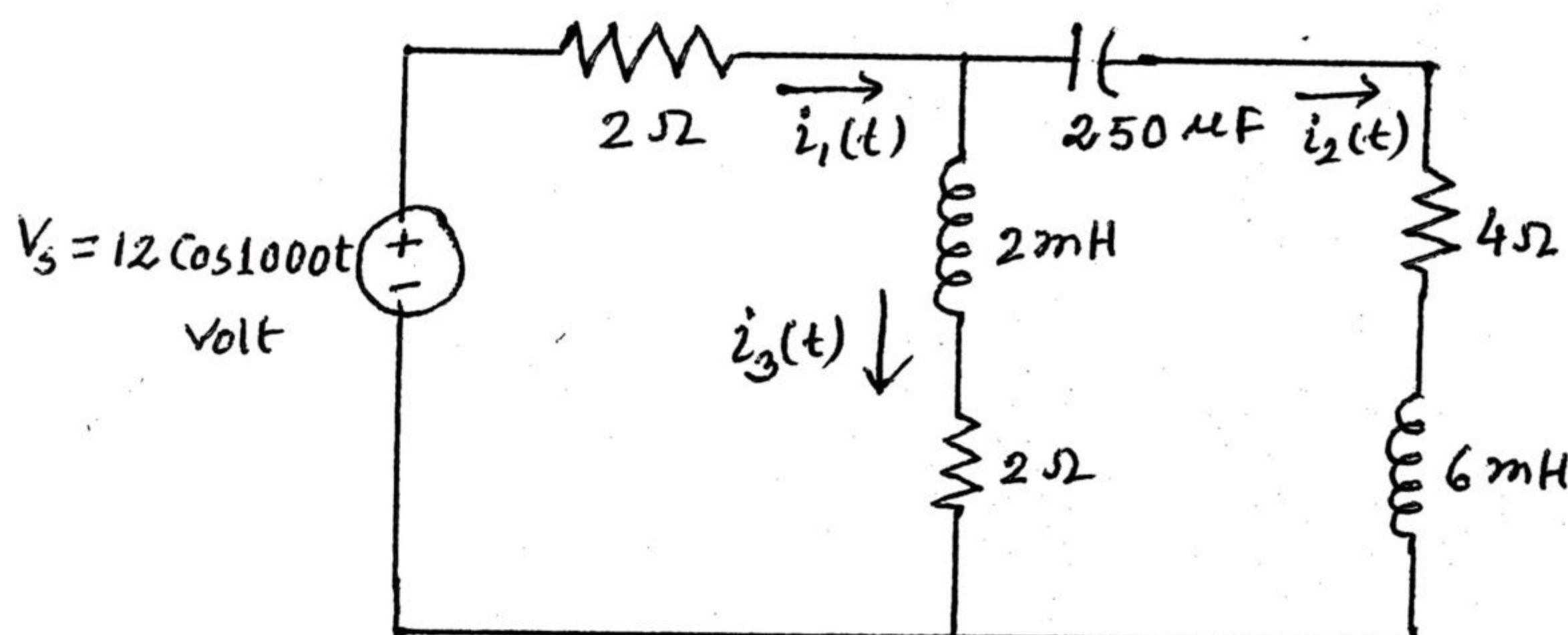
10. a)   In the circuit below, find current through the 1.375 Ω resistor and hence verify the reciprocity theorem.   **5**
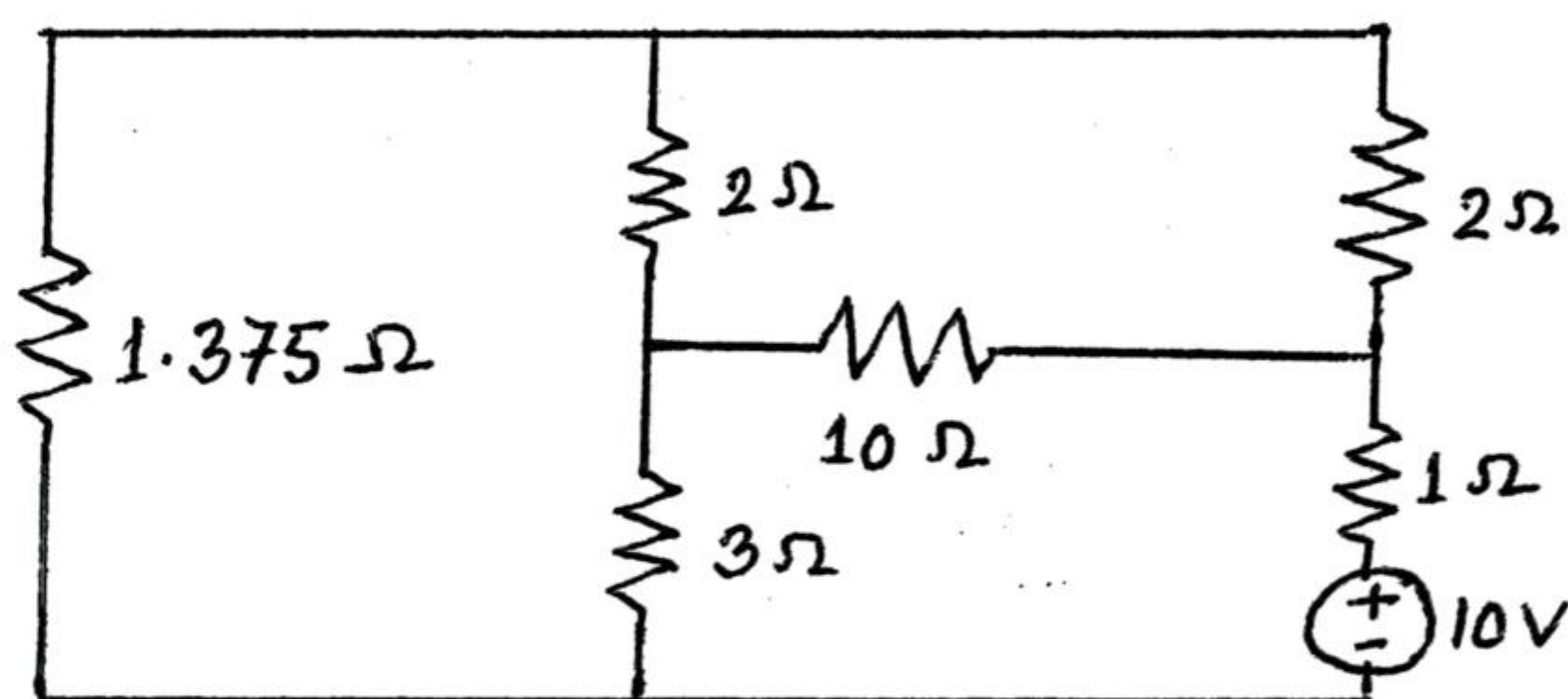
   b)   In the circuit below, find the voltage drop across the load resistor 2kΩ using Norton's equivalent network   **5**
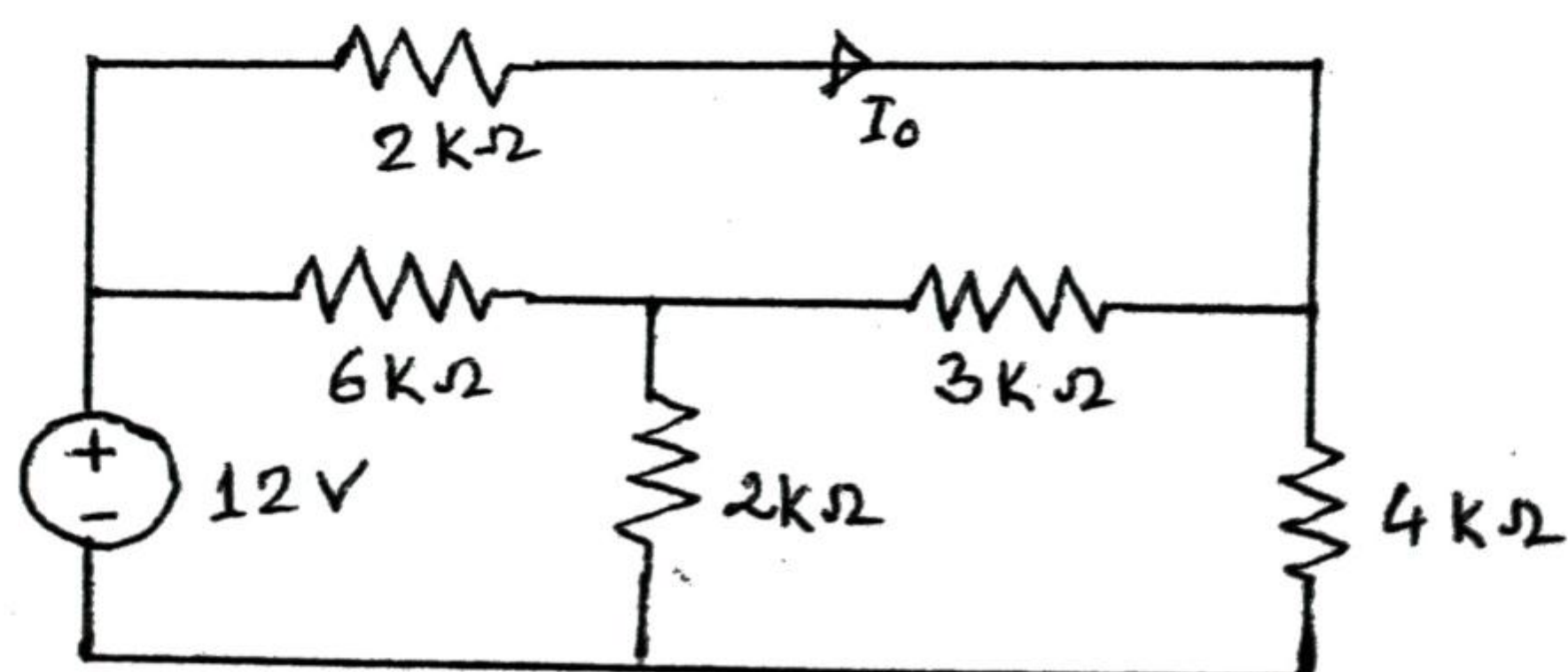
Section-A

1. a) Define nutritional emergency. State the central reasons for nutritional emergency. 4
    b) Why does nutritional emergency become an important issue now? Who are at danger in emergency condition? 3

2. a) What do you know about nutrition education? Define mass media with example. 3
    b) Describe the strategies involved in community outreach nutrition program. 4

3. a) "Food supplements are considered risk for health"- Explain. 2
    b) What are the vital selection criteria for carrier food and fortificant? Describe the necessary conditions for successful food fortification program? 5

4. a) How do you identify Protein Energy Malnutrition (PEM)? 4
    b) Briefly discuss on Anemia and Xeropthalmia. 3

5. a) What do you mean by nutritional assessment? 2
    b) Briefly describe the dietary history method in nutritional assessment. 5

6. a) What is emergency feeding program? Classify it. 3
    b) Write the difference between 'onsite food ration' and 'take home food ration' in a supplementary food distribution system. 4

Section-B

7. a) What is gender inequality? How does it affect nutritional status of a nation? 3
    b) How women become victim of gender discrimination in our country? 4

8. a) Discuss "Hazard profile in Bangladesh". 3
    b) When and why food shortages arise in our country? 4

9. a) State the consequences of micronutrient deficiency among life cycle. 3
    b) How do you select people for supplementary feeding and therapeutic feeding program? 4

10. a) Write a comparison between survey and surveillance. 3
    b) What types of food supplementation used to combat nutritional problem? 4

11. a) "Disaster management is a fundamental issue in our country"- Explain. 2
    b) Discuss the disaster management cycle with diagram. 5

12. Write short notes on
    i.   Bitot's Spot 2
    ii. Hunger gap 2
    iii. Hidden hunger 3