TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	40
Programme	BAR	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Construction IV (*AR 604*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Explain the concrete portal frames and write its advantages? Explain the types of connections system for a portal frames. [5+3]
2. Write about fireplace and its components with neat sketches. Explain the requirements of typical fireplace and chimney. [4+4]
3. What are the factors considered while planning escape routes for fire safety? With the help of sketches, show how fire protection in structure is done in following cases. [4+4]
   a) Steel construction
   b) R.C.C Construction
4. Explain thermal comfort. How are sound absorbents classified? Explain with sketches the various sound insulation techniques adopted on concrete floors. [2+3+3]

   OR

   Write about elevators and its types. Explain with sketches the water supply distribution system from city main supply to the wash basin in the toilet. [3+5]
5. Explain any two of the following: [2×4]
   a) Shell roofs
   b) Traditional timber windows
   c) Preservation of timber rot
   d) Rain water harvesting

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	**Full Marks**	40
Programme	BAR	**Pass Marks**	16
Year / Part	III / I	**Time**	1 ½ hrs.

Subject: - Building Construction IV *(AR 604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are domes and where are they used? Explain the construction of concrete barrel vault with its advantages and disadvantages. [2+6]
2. What are the features of traditional construction in Nepal? Explain the types and construction of JHYAs used in traditional timber Construction. [4+2]

OR

Write about fireplace and its components with neat sketches. Explain the requirements of typical fireplace and chimney. [2+4]

3. What are the factors considered while planning escape routes for fire safety? With the help of sketches, show how fire protection in structure is done in following cases. [4+4]
   - Steel construction
   - R.C.C Construction
4. Explain thermal insulation. With the help of sketch show how the sound insulation is done in the following building areas. [2+4]
   a) Door openings
   b) Roof
   c) Wall

OR

Explain the defects of reflected sound? How are sound absorbents classified? Explain with sketches the various sound insulation techniques adopted on concrete floors. [2+2+2]

5. Write short notes on: (Any Three) [3×4]
   a) Types of Air Conditioning System
   b) Water distribution system
   c) Vertical Transportation in Buildings
   d) Sustainable Construction

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9) TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Ashwin

Exam.	Back		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Support your answers with neat illustrated sketches where necessary.*

1. What is structural protection in case of fire safety construction? With the help of sketches, how is structural protection done in the following cases?

   a) steel columns and beams b) RCC columns and beams c) RCC floors [2+6]

2. Explain sustainable buildings. With the help of sketches explain the green building construction. [3+5]

   OR

   Explain the concrete portal frame and what are its advantages. Explain the foundation fixing connections in concrete portals. [4+1+3]

3. Explain the steel portal frame. What are the foundation fixing options in steel portals? How are portal frames spaced? [4+3+1]

4. Explain the components and principles of a lift system. Explain the elevator layout arrangement. [4+3]

   OR

   Why is HVAC necessary and what does it involve. Explain the types of HVAC units. [3+4]

5. Explain any THREE of the following: [3+3+3]

   a) Fire Escape
   b) Sound Insulation in floors
   c) Thermal insulation of roofs
   d) Electricity supply and distribution

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	40
Programme	BAE	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Construction IV *(AR 604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain steel portal frame. Write about its details? What are its advantages and disadvantages? [2+4+2]
2. a) Write about fireplace and its components with neat sketches. [4]
   b) Describe the traditional roof construction of Nepal. [4]
3. Explain thermal insulation. Also, describe with sketches thermal insulation construction techniques in a room. [2+6]
4. Write about elevator and its types. Describe about its various components with sketches. [4+4]

   Or,

   What are the different processes involved in an air conditioning system? Explain with relevant sketches. [8]
5. Write short notes on: *(Any Two)* [4x2]
   a) Rain water harvesting
   b) Methods for preservation of timber
   c) Fire prevention and protection techniques
   d) Shell and domes

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91 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is acoustic, echo and reverberation? Explain with the help of sketches the sound insulation in Concrete floors. [1+1+1+7]

OR

What is thermal insulation and what are its advantages? Explain with the help of sketches the thermal insulation in roof. [1+2+7]

2. a) Explain the construction of traditional timber post, lintel and beam construction? [4]
   b) Explain with the help of sketches the different components of a typical fireplace and chimney. [4]
3. Define steel portal frames with sketches; also highlight the advantages of these portal frames. Sketch the various foundation details of steel portals. [6+4]
4. Write short notes on: (Any three) [3×4]
   a) Prevention of defects on Materials from Corrosion, Efflorescence, stains and rusting
   b) Fire resistant construction
   c) Sustainable Construction
   d) HVAC
   e) The factors used for planning escape routes for fire safety

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. What is acoustic, echo and reverberation? Explain with the help of sketches the sound insulation in concrete floors. [1+1+1+7]

   OR

   What is thermal insulation and what are its advantages? Explain with sketches how the thermal insulation is done in roof? [1+2+7]

2. What are traditional timber constructions? Explain the construction of traditional timber post, lintel and beam construction? [2+4+4]

   OR

   Explain with the help of sketches the different components of a typical fireplace and chimney. Explain the requirements of a typical fireplace and chimney. [5+5]

3. Explain the pocket and base plate connection in foundation fixing in concrete portal frames. What are the advantages of concrete portal frame? [3+3+2]

   OR

   Explain the steel portals and its strengthening options at the knee and ridge areas. [2+6]

4. Write short notes on (Any three) [4+4+4]
   a. Efflorescence in brickwork.
   b. Fire resistant construction in steel beam.
   c. Solar energy harvesting.
   d. Escalator.
   e. The factors used for planning escape routes for fire safety.

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain with the help of sectional sketches the sound insulation in timber floors. [4]
   b) Explain with the help of sectional sketches the thermal insulation in RCC roof. [4]
2. a) Explain the design and construction of traditional timber roof showing neat sketches. [4]
   b) Explain with the help of sketches the different components of a typical fireplace and chimney. [4]
3. Explain the concrete portal frame. Explain the pocket connection in foundation fixing in these frames. What are the advantages of concrete portal frame? [2+4+2]

   OR

   Explain the space grid flat roofs and their advantages and disadvantages. [3+5]
4. What are the design requirement and components of an elevator? Explain the different types of elevators with sketches. [3+5]

   OR

   What do you understand by vertical transportation? Explain the elevators layout arrangement with sketches [3+5]
5. Write short notes on: (any two) [4+4]
   a) The factors for planning escape routes for fire safety
   b) Corrosion in concrete
   c) Barrel vault
   d) Solar energy harvesting

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11 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. What is thermal insulation and what are its advantages? Explain with sketches how the thermal insulation is done in roof?
2. Explain with the help of sketches the different components of a typical fireplace and chimney. Explain the requirements of a typical fireplace and chimney.
3. Explain the concrete portal frame. Explain the pocket connection in foundation fixing in these frames. What are the advantages of concrete portals?
4. Explain the construction techniques of the shell and vault with example. Also highlight its uses.
5. Write short notes on: (any four)
   i) Efflorescence in brickwork
   ii) Fire resistant construction in wall
   iii) Sustainable building
   iv) Elevators
   v) The factors used for planning escape routes for fire safety

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11 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. What is fire load? What are the types of fire loads considered? What are the important considerations to be made in fire resistant construction?
2. What controls are made to reduce heat in buildings? With the help of sketches show how thermal insulation is done in the following building areas.
   a) Door openings
   b) Metal roofs
   c) Concrete roofs
3. Discuss the HVAC system in buildings.
4. Explain the steel portal frame. What are the foundation fixing options in steel portals? How are portal frames spaced?
5. Write short notes on: (any two)
   a) Roof construction in traditional timber construction
   b) Construction requirement of fireplace
   c) Rain water Harvesting
   d) Provision of fire safety in Nepal

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11 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Construction IV (AR604)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions,*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain concrete portal frames with its advantages and disadvantages. Explain pocket connection of foundation fixation in concrete portal frames. [5+3]
2. Define architectural acoustics. How sound insulation can be achieved in concrete and timber floors. [2+6]
3. Explain with neat sketches, the design and construction of a fireplace. [8]
4. What are the technical parameters to be considered while designing the lifts and the elevator? [8]
5. Write short notes on: (any two) [4+4]
   a) Traditional timber windows
   b) Escape route planning for fire safety
   c) Rain water harvesting
   d) Preventive treatment for efflorescence, leaching and staining

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11 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain with sketches different types of portal frames. Also highlight its advantages. [8]
2. Explain sound insulation? Explain thermal insulation construction techniques used in the room with the help of sketches. [8]
3. What are fire loads? Write the consideration for the fire resistant construction with sketches. [8]
4. What are the different processes involved in an air conditioning system? Explain different types of air conditioning unit and their usage. [3+5]
5. Write short note on: (any two) [4×2]
   a) Traditional timber roofs
   b) Construction requirement of chimney in fireplace
   c) Eco friendly concepts is sustainability construction
   d) Explain notting and conation in timber and concrete

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11 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the important considerations to be made in fire resistant construction? Explain the fire resisting capabilities of the following materials: [2+6]
   i. Timber
   ii. Steel
   iii. Concrete

2. Explain concrete portal frames and its advantages. Explain pocket connection in foundation fixing in these frames. [4+4]

3. What are the different processes involved in an air conditioning system? Explain different types of air conditioning unit and their usage. [3+5]

4. What is acoustics, reverberation and reverberation time? Explain with sketches, how the sound insulation is done in concrete and timber floors. [3+5]

5. Write short notes on (Any 2) [4+4]
   a. Efflorescence
   b. Solar energy harvesting
   c. Traditional timber post and lintel construction
   d. Types of fire places

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11 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2069 Chaitra

Exam.	**Regular**		
Level	BE	**Full Marks**	40
Programme	B. Arch.	**Pass Marks**	16
Year / Part	III / I	**Time**	1½ hrs.

Subject: - Building Construction IV *(AR604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the factors used while planning escape routes for fire safety? Explain with the help of sketches how the structural protection is done for [3+5]
   a. Steel Construction,
   b. Reinforced Concrete Construction.

2. a. With the help of sketches different components of a typical fireplace. [4]
   b. Explain the design and construction of a traditional timber roof construction. [4]

3. What are domes and where are they used? Explain the construction of a concrete barrel vault with its advantages and disadvantages. [2+6]

4. What are design requirement and components of an elevator? Explain the different types of elevators with sketches. [3+5]

5. Write short notes on (Any **two**) [4+4]
   a. Thermal insulation in roofs
   b. Sound insulation in timber floors
   c. Corrosion in concrete
   d. Solar energy harvesting

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	**Regular**		
Level	BE	**Full Marks**	40
Programme	BAR	**Pass Marks**	16
Year / Part	III / I	**Time**	1 ½ hrs.

Subject: - Building Services I *(CE 607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) What are the objectives of water supply schemes? [2]
   b) Explain Rain water harvesting, Fog collection and Conservation pond briefly and highlight their importance. [4]
2. a) Differentiate between central heating system and local (instantaneous) heating system of hot water supply in a house. [4]
   b) Define service connection and list out materials use for water supply and sanitation services. [2]
3. a) Define per capita demand and list out various factors affecting per capita demand. Calculate the design water demand for the year 2035 for a rural village of Nepal by Arithmetical, geometrical and by incremental increase method. [2+4]

Year AD	1971	1981	1991	2001	2011
Population	8500	10050	14000	18400	22800

   b) For an unsewered area, design a septic tank and the soak pit based on the following data.
      i. No of users = 45
      ii. Rate of sewage flow = 100 liters/capita/day
      iii. Detention time = 1 day
      iv. De-sludging period = 3 years
      v. The absorption value of the soil is 75 liters/m^2/day
      vi. Ground water table is 4 m below from ground surface

   Draw plan and section of septic tank and soak pit to justify your design. [6]
4. a) Define plumbing traps, street inlets and their types with neat sketches. [2+2]
   b) Define eco sanitation and design a pit latrine with neat sketch considering following data for rural areas. [1+2]
   No. of users = 25
   Sludge accumulation rate = 0.075 m^3/person/year
   Cleaning period = 2 years
5. Write short notes on: (Any Three) [3×3]
   a) Properties requirements for wholesome water
   b) Principles of sanitation
   c) Drop Manhole
   d) Solid waste collection and disposal system

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02 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Ashwin

Exam.	Back		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Enumerate the objectives of water supply in reference to environment and health. Explain the selection criteria for sources of water. [2+3]
2. Define head loss in pipe and fitting. What are the factors that affect the head loss in pipe? [2+4]
3. The following is the population data of a city available from past census records. Determine the population of a city in 2090 by any two methods. [4]

Year	2020	2030	2040	2050	2060	2070
Population	16,500	26,800	41,500	57,500	68,000	74,100

4. Describe wholesome Potable water and contaminated water. List out the objectives of water treatment. [3+2]
5. Design a septic tank and soak pit for a guest house. Expected guests are 15 per day in an average. Guesthouse is situated in an area of 2 ropani. The de-sludging period of septic tank is 3 years; detention time is 24 hours; rate of sewage flow is 75 litres/capita/day and the absorption value of the soil is 75 liters/m^2/day. [5]
6. Define plumbing traps, street inlet. Draw a Schematic diagram of a house plumbing layout system. [2+4]
7. Write short notes on: (Any three) [3×3]
   a) Objectives of sanitation
   b) ISWM 5R principles
   c) Echo sanitation and Pit latrine
   d) Maintenance of building plumbing

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	40
Programme	BAE	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services I *(CE 607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Write down the objectives and essential components of water supply system. How do you minimize scarcity of water by using rain water harvesting? Describe it briefly with its components and sketches. [2+4]
2. List out types of maintenance of building plumbing and describe direct and indirect cold water supply system with necessary sketches. [1+3]
3. What are the various appurtenance uses for the distribution of water supply system? Briefly describe different types of valves. [1+3]
4. Forecast the population of the year 2024 from the data given below using arithmetic and incremental method. [4]

Year (A.D.)	1960	1970	1980	1990
Population	25,000	27,500	33,000	39,0000

5. Describes the different types of impurities in water. Discuss about water quality standard. [2+2]
6. For an unsewered area of district, design the septic tank and soak pit based on the following available data.
   i) Number of Average users = 20
   ii) Rate of Sewage Flow = 70 liters/ capita/ day
   iii) Detention time = 24 hours
   iv) De-sludging period = 3 years.
   v) The absorption value of the soil = 80 liters/m^2/day
   vi) Average ground water table is 4 m below from the ground level.
   Draw, plan and section of spetic tank and soak pit to justify your design. [6]
7. What are the primary methods of solid waste disposal system. Explain the eco-sanitation concept. [3+3]
8. Write short notes on: *(Any Two)* [3x2]
   a) Manholes
   b) Objectives of sanitation
   c) Pit latrine and VIP latrine

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92 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. List out the various underground sources of water for water supply scheme. Describe how water supply is related to public health? [2+3]
2. What are factors influencing population growth. Why is population forecast necessary in planning and design? Forecast the population for the year 2046 from following census data using any of the three methods. [6]

Year	1971	1981	1991	2001	2011
Population	39000	43000	48000	54000	64000

3. How do you differentiate polluted and contaminated water? Describe about the wholesome water. What type of impurities found in surface water and treatment units required for their impurities? [5]
4. What type of sewage appurtenances we use in storm water management for a rural village in hilly area having slope 1 in 30 and red soil? Explain any two appurtenance with neat sketch in those area? [5]
5. Design and sketch a septic tank and soak pit for an average users 50. The characteristic of soil is sandy soil and land area is three and half ropani. The de-sluding period of septic tank is 3 years. For your design, take the detention time in septic tank as 24 hours. Rate of water supply as 110 lpcd and the absorption capacity of soil as 90 liters /m^2/day. [6]
6. Define different types of maintenance of building plumbing briefly. [3]
7. Write short notes on: (Any four) [2.5×4]
   a) Composting of household solid waste
   b) ISWM and co-sanitation
   c) VIP latrine
   d) Constructed welt land
   e) Incineration

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. List out the objectives of water supply system. Describe rain water harvesting with neat sketch. [2+3]
2. Define service connection. List out the factors that affect the head loss on piping system. [1+3]
3. Define design period. Forecast the population of Keshabtar village in the year 2040 A.D. by using a) Arithmetic increase method b) Geometrical increase method. [1+4]

Year (A.D)	1985	1995	2005	2015	2040
Population	5000	8000	12000	16000	?

4. Describe wholesome water and pure water. Draw schematic diagram of a typical water treatment plant with corresponding components name. [2+2]
5. For an unsewered area, design the septic tank and soak pit as per following data. [6]
   i. No. of users= 15
   ii. Rate of sewage flow=75 liters/capita/day
   iii. Detention time= 24 hours
   iv. De-sludging period= 3 years
   v. The absorption value of the soil= 100 liters/m^2/day
   vi. Average ground water table is 4m from ground level.

   Draw the neat sketches of septic tank and soak pit for the above designed dimensions.
6. Define traps. Design a VIP latrine with following data. [1+3]
   i. No. of users= 10
   ii. Sludge accumulation rate = 0.05m^3/person/year
   iii. De-sludging period= 2 years

   Draw the neat sketches to justify your design.
7. Write short notes on: **(any four)** [3*4]
   a. Street inlets
   b. Eco sanitation
   c. Grease and oil traps
   d. Methods of sludge disposal
   e. Manhole
   f. 5R principles of solid waste management.

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1 Enumerate the objectives of water supply in reference to environment and health. Draw the flow chart of water supply from source to consumer and indicate the component. [5]

2 Draw typical hot and cold water supply system in multi storey building. Describe the step of maintenance of building plumbing system. [5]

OR

Draw rainwater harvesting system and explain the main component.

3 What is design period and per capita demand of water? Forecast the population for the year 2036 from following census data using any two methods. [5]

Year	1981	1991	2001	2011
Population	39000	43000	48000	54000

4 What do you mean by pure water and wholesome water What is impurities and named the types of impurities in water? Why treatment of water is necessary? [5]

5 Why following appurtenances is need explain with neat sketch? Manhole, Catch pits and Septic tank and Soak pit. [5]

6 Design a septic tank and soak pit for 25 numbers of average users. The characteristic of soil is sandy soil and land area is two and half ropani. The de-sludging period of septic tank is 3 years for design and take detention time in septic tank is 24 hours. Rate of water supply is 80 lpcd and the absorption capacity of soil is 110 liters /m^2 / day. [5]

7 Writes short notes (any five) [5*2]

a) Rain water harvesting
b) Population forecast
c) Solid waste and 5R
d) composting
e) Sewer, sewage and Sewerage system
f) Inlet for road drainage
g) Rural sanitation

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13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. List out the essential components of water supply schemes with the help of sketch. Explain the selection criteria for sources of water. [2+4]
2. Define head loss on pipe and fittings. What are the factors that affect the head loss on pipe? [2+4]
3. Define population forecasting. Forecast the population of a Sukhaura village in the year 2035 by using (a) Arithmetic increase method and (b) Geometrical increase method. [1+4]

Year AD	1985	1995	2005	2015	2035
Population	32500	36000	38500	44500	?

4. Describe wholesome water and contaminated water. List out the various objective of water treatment. [1+1+2]
5. For an unsewered area, design the septic tank and the soak pit for the following data. [6]
   i) No of users = 20
   ii) Rate of sewage flow = 75 liters/capita/day
   iii) Detention time = 24 hours
   iv) De-sludging period = 3 years
   v) The absorption value of the soil is 75 liters/m^2/day
   vi) Ground water table 4 m from ground surface

   Draw the neat sketches of septic tank and sock pit for the above designed dimensions
6. What is eco sanitation? What is the advantage of VIP latrine over pit latrine? Describe with sketch. [1+2]
7. Write short notes on: (any four) [10]
   i) Grease and Oil Traps
   ii) Manhole
   iii) Solid waste collection and disposal system
   iv) Street inlets and catch basins
   v) Relate sanitation, environment and public health
   vi) Detention time and Desludging period

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Discuss the importance of study of water supply and sanitary engineering in reference to the public health concern. [3]
2. What is service pipe connection? Describe various types of maintenance of building plumbing system. [1+3]
3. What is the head loss in pipe? Name the appurtenances used in household water plumbing. Draw the typical storage tank and indicate the component. [1.5+3+1.5]
4. Discuss any three method of population forecast? Using at least two methods forecast the population for 2100 BS from following census data: [1+3]

Year (BS)	2020	2030	2040	2050	2060	2070
Population in thousand	72	85	110	144	184	221

5. Identify the different impurities responsible to make worse the water quality? What is a water treatment and why treatment is necessary? Draw a typical flow chart of a water treatment method and name the component. [1+2+1]
6. What is sewage collection and disposal? Describe about Eco sanitation and VIP latrine. Draw the typical layout of the rainwater disposal from the roof and cut. [1+2+3]
7. What is rural sanitation and name the means of rural sanitation? What is solid waste and what is solid waste management. Name some method of solid waste management. [2+2+1]
8. Draw the neat sketch of water closet, kitchen sink, septic tank and soak pit. [4]
9. Write short notes on: (any two) [2×2]
   a) Factors affecting water demand
   b) Sewage disposal from isolated building
   c) Solid waste collection

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12 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the different types of sources of water? Discuss the concept of water supply and sanitary engineering development in reference to the public health concern. [6]
2. What are the various sources of water used in the water supply system? Why treatment of water is necessary? Discuss different treatment processes adopted in water treatment. [1+2+2]
3. Why population forecast is necessary? Forecast the population of community for the year 2020 using any two methods from following data: [4]

Year	1980	1990	2000	2010	2020
Population	8000	12000	17000	22500	?

4. What are the impurities in water and why treatment is required? Why storage of water is needed? Draw a sketch of typical water tank showing all components. [5]

OR

Name the different process of water treatment and explain any one and also explain the necessities of treatment. Draw a sketch of typical water tank showing all components.

5. Describe the construction of manhole with a neat sketch. [5]
6. Design a septic tank and soak pit for 12 numbers of average users. The rate of sewage is 110 lpcd. The percolation of soil is 25cm/min. The desludging period of septic tank is 3 years for design. Assume other data if required appropriately. [5]
7. Differentiate between pit latrine and VIP latrine. [4]
8. Write short notes on: (any four) [6]
   a) Rainwater harvesting
   b) Water treatment
   c) Grit chamber
   d) Eco sanitation
   e) 5 R principle of solid waste management
   f) Fecal oral transmission

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12 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Named different type of water sources. Describe the importance of rainwater harvesting and method of collection. [1+3]
2. Name the material used for service pipes in building water supply. Draw neat line diagram of hot and cold water supply in buildings. [1+5]
3. The following data shows the variation of the population of a village of Tanahum district from 1980 to 2010. Estimate the population of the village in the year 2030 by using (a) Arithmetic increase method (b) Geometrical increase method and (c) Incremental increase method. [6]

Year AD	1980	1990	2000	2010
Population	32000	35000	38500	44000

4. What are the impurities responsible to deteriorate the water quality? What is water treatment and why treatment is necessary? Draw a typical flow chart of a water treatment method and named the component. [1+2+1]
5. For an unsewered area, design the septic tank and the soak pit for the following data. [6]
   i) No of users = 16
   ii) Rate of sewage flow = 75 liters/capita/day
   iii) Detention time = 24 hours
   iv) De-sludging period = 3 years
   v) The absorption value of the soil is 100 liters/m^2/day.

   Draw the neat sketches of septic tank and soak pit for the above designed dimensions.
6. Define solid waste and solid waste management. Discuss the importance composting and incineration in household level. [2+3]
7. Write short notes on: (any three) [3×3]
   i) Grease and Oil Traps
   ii) Pit latrine
   iii) Street inlets
   iv) Surface water sources

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	3 hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. List the typical components of public water supply scheme with a neat flow diagram. 2
2. What do you understand by rainwater harvesting? Describe it in terms of suitability, water quality and quantity. 4
3. Sketch a typical service connection from the water mains and describe its components. 6

   OR

   Draw a typical layout of hot and cold water supply system in a two storey building. Describe how maintenance of building plumbing is done.
4. Estimate the population of a town in the year 2021 and 2031 from the census data given below by (a) Arithmetical increase method, (b) Geometrical increase method and (c) Incremental increase method. 6

Year (AD)	1971	1981	1991	2001
Population	69,000	73,000	85,000	91,000

5. What is water treatment? Describe the functions of each process with a help of a neat schematic diagram of water treatment. 4

   OR

   Write short note on any one:
   a) Wholesome, potable, contaminated water and water quality standard.
   b) Domestic water purification techniques.
6. How sanitation can improve the environment and public health of a community? 3
7. Describe the functions of various components used in rainwater collection and disposal. 6

   OR

   Design a septic tank and soak pit for 10 users. Assume the rate of wastewater as 80 lpcd. The detention time in septic tank is 24 hours and sludge is cleaned from septic tank once in every 3 years. The absorption value of soil is 100 liters/m^2/day.
8. Draw and describe Manhole, Catch pits. 4
9. Describe the collection and disposal technique of night soil in a rural area. 3
10. Describe the process of composting of solid wastes. 2

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services I *(CE607)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Describe the objective of water supply system. What is water treatment? Describe the significance of water treatment in reference with public health. [2+3]
2. List out the various sources of water for water supply scheme. Explain with sketches showing its various components about rain water harvesting. [4]
3. A cold-water storage tank in a house with five occupants is to have a capacity of 100 l/per person and be fed from a water main able to pass 0.25 l/s. How long will it take to fill the tank? [4]
4. List the different methods of forecasting the future population of a community. Predict the population by any two methods in the year 2020 from following census data of a community. [6]

Year	1980	1990	2000	2010
Population	20000	24500	29500	35200

5. What do you understand about potable and brackish water? What are the requirements wholesome water? [4]
6. Draw sketch of septic tank and soak pit with required appurtenances and dimension. [4]
7. Sanitation and public health are interwoven. In this context how you correlate Sanitation, Environment and Public health. [4]
8. Write short notes on: (any three) [9]
   i) Integrated solid waste management and 5R principle of solid waste management
   ii) Bath tub
   iii) Eco sanitation
   iv) Sink (with sketch)

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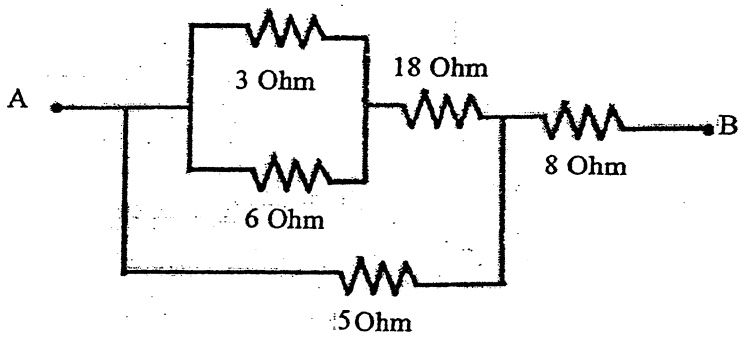
TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	40
Programme	BAR	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services II (*EE 604*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Calculate the equivalent resistance of the following combination of resistance and also find the power dissipation across 5 Ohm resistance, when potential difference of 240v is applied between points A and B. [6]



2. The front of the building measuring 60m and 15m is to be floodlighted by means of projectors placed at a distance of 8m from the wall. The average illumination required is to 50 lux. It 50 watts lamps having a lumen output of 900 lumens are used in the projector, calculate number of projectors required and the projecting angle. [6]

   (WF = 1.2, UF = 0.5, DF = 0.8)

3. Determine the size of 3.5 core copper cables for MDB to two SDBs, required to carry the maximum current of 60A. It is given that length of two cables is 200m and 100 m. The permissible voltage drop is 2% of supply voltage. The supply system is 3-phase, 400V. Current ratings of copper conductor are given below. [4]

Area of conductor (sq.mm.)	1.5	2.5	4	6	10	16	25	35	50
3.5 core cable current rating (A)	21	27	36	45	60	77	99	120	145

4. State the various types of protection devices that are used in electrical installation of commercial building. Explain operating principle of MCB with neat sketch. [8]
5. Write about the geothermal type refrigeration system for air conditioning of a building. [4]
6. It is required to design a lighting installation in the fitting department of a garment industry. The work is done at a height of 1 meter above floor level and dimension of the hall is 25m by 10m. The hall is illuminated 2×20W LED tube lamp with reflector. The efficiency of the lamp is 110 lumen per watt. Assuming necessary data, draw a neat sketch showing arrangement of lamps, sub-circuit, and switches. Describe the distribution boards for the loads, if supply system is 3 phase, 400v 50Hz. [12]

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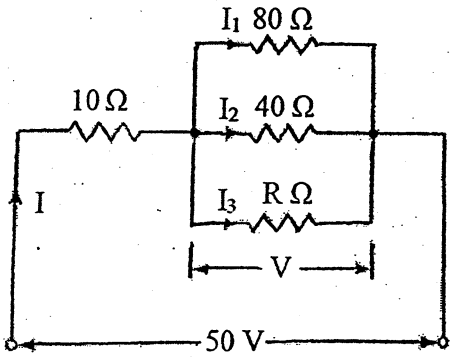
TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BAR	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services II *(EE 604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Determine the value of R, if the power dissipated in 10 ohms resistor is 40 W for the circuit shown below: [4]



b) Three similar resistors, each of 10Ω, are connected in star to a 3-phase, 400V and 50 Hz supply. Calculate [6]
(i) The phase voltage
(ii) The line current
(iii) The total power absorbed
(iv) The current at neutral conductor

2. a) A meditation hall of 24 m × 20 m is illuminated to an average illumination of 120 lumens/m^2 on a horizontal plane parallel to the floor. The walls and ceilings are brightly painted. Design a suitable scheme of illumination using twin LED Tube of 18 W each with lumen efficiency of 110 lumen/watt. Consider, coefficient of utilization is 0.8 and depreciation factor is 1.11. Also design the lighting/power sub circuit and distribution board if the supply is 3 phase, 380 V, 50 Hz. [12]

b) Determine the appropriate size of the copper cable for a single phase, 20 kW, 220 Volt load at p.f. of 0.85 lagging at 20 m distance from the supply end. The current ratings of Copper conductor are given in the table below: [4]

Conductor area sq.mm	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150
3.5 core cable (A)	21	27	36	45	60	77	99	120	145	175	210	240	270

c) Describe the operating principle of Miniature Circuit Breaker (MCB) with simple sketch. [4]

3. a) What factors should be considered while calculating the size and number of lift for building? [6]

b) Determine the maximum and minimum illumination on the surface of a square table measuring 1 meter on each side, when a lamp with 400 CP illuminates in all directions is suspended above the centre of the table at a height of 2 meters. [4]

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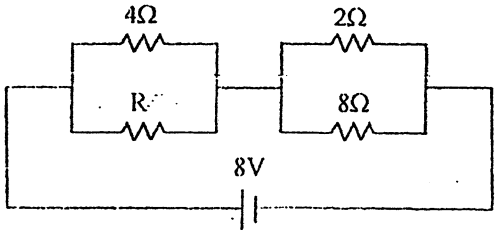
TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BAR	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services II *(EE 604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) If the total power dissipated in the network shown in figure below is the 16 watts, find the value of R, and the total circuit current. [4]



b) A 3 phase circuit of star connection is being supplied by 400V, 50Hz source. A resistive load of 10 ohm is connected in each phase. Calculate the neutral current and total power absorbed by circuit. [6]

2. a) The Supermarket hall measuring 35m × 15m is to be provided with illumination scheme at 200 lux and to be provided with led lamp of 40 watts each. Calculate and arrange the number of luminaries required to be fitted in the hall, assuming the coefficient of utilization and the depreciation factor to be 0.6 and 1.1 respectively. Also design the number of sub-circuits, switches and distribution board, if the supply system is single phase, 220 V, 50Hz. If efficiency of led lamp set is 80 lumens/watt. [12]

b) Calculate the appropriate size of copper cable for a three phase four wire circuit of 400V. The loads are two numbers of heaters (16kW each) running parallel, both at a distance of 100m from the supply end. The permissible voltage drop is 2% of the rated voltage. Current rating table of copper conductor is given below. [4]

Cross section area (sq.mm)	1.5	2.5	4	6	10	16	25	35	50
Current rating (A)	16	23	34	44	57	80	105	125	150

c) With the help of neat sketch, explain operating principle of miniature circuit breaker, considering overload and short circuit protection. [4]

3. a) Explain in brief on different type of earthing. Calculate the area of plate earthing so that the resistance is 8 Ω and soil resistivity is 40 Ω-m. [3+3]

b) Write down the general rules of wiring system which are kept in mind in execution of internal wiring and installation. [4]

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93 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Ashwin

Exam.	Back		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. A circuit consists of two parallel resistor having resistance of 20 Ω and 30 Ω respectively connected in series with a 15 Ω resistor. If the current through 30 Ω resistor is 1.2 A, find (i) currents in 20 Ω and 15 Ω resistors, (ii) the voltage across the whole circuit (iii) voltage across 15 Ω resistor and 20 Ω resistor (iv) total power consumed in the circuit. [4]
2. Compare the MCB and re-wireable fuse. Explain the operating principle of MCB with simple sketch. [4]
3. Explain the various methods of electrical wiring. Describe briefly most common method of electrical wiring. [6]
4. Explain the different types of heating system of the building. [4]
5. What is system earthing and equipment earthing? It is required to have an earth resistance of 8 ohm in a system having soil resistivity of 40 Ω-m. Calculate the size of plate earth electrode. [4]
6. A three phase star connected system with 230V between each phase and neutral has resistance of 10, 11 and 15 Ohms respectively.
   a) Calculate current flowing in each phase and neutral current
   b) Find the total power. [6]
7. The banquet hall 45m. × 30m × 5m is to be illuminated by LED light of 30 W, an average illumination of 300 lum /m^2 is to be provided on the working plane. The walls and ceiling are brightly painted. Draw layout diagram of light fixtures, switches, power socket and design distribution board. Decide the number of light and power sub-circuit and the supply is 3-phase 4 wire system. Assume suitable value for utilization and maintenance factor and lamp efficiency is 100 lum / watt. [12]

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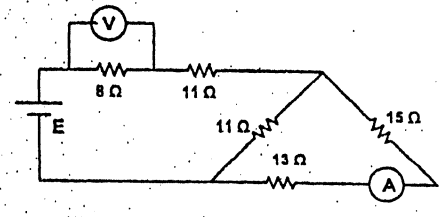
TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	40
Programme	BAE	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services II *(EE 604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. A battery of unknown emf is connected across resistances, as shown in figure. The voltage drop across the 8Ω resistor is 20V. What will be the current reading in the ammeter? What is the emf of the battery? [5]

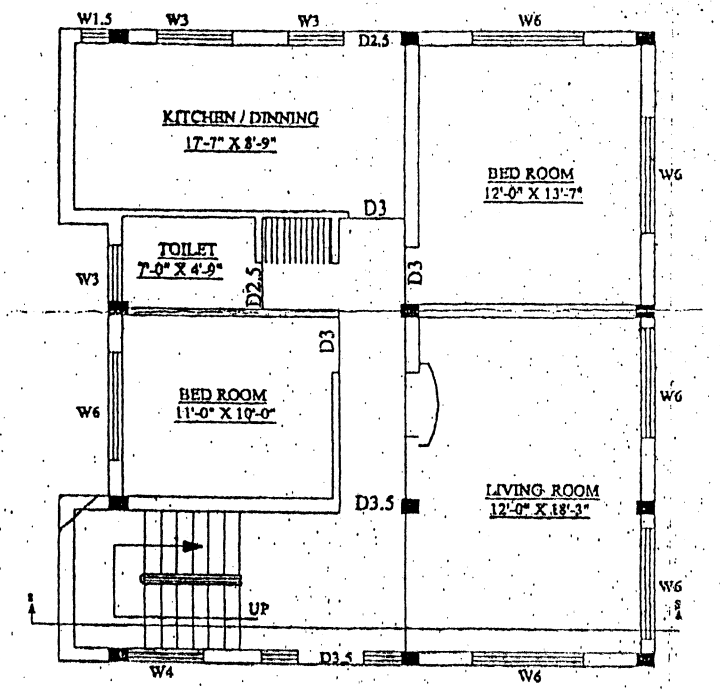


2. What is rupturing capacity of MCB. Explain the operating principle of MCB. [5]
3. Determine the appropriate size of the copper cable for a three phase 4 wire, 400volt, 70kW load at 30m distance from the supply end. The current ratings of Copper conductor are given in the table below: [4]

Conductor area sq. mm	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150
3.5 core cable (A)	21	27	36	45	60	77	99	120	145	175	210	240	270

4. What is earthing? Discuss the importance of earthing, and explain the plate earthing system. [4]
5. When we calculate the nos and capacity of the lift, what factors should be considered? [4]

6. For the given building,
   a) Design Electric lighting and power system separately
   b) Draw layout diagram of light fixtures, switches, power socket and distribution board
   c) Decide the number of light and power sub-circuit
   d) Detail design of distribution board. If the supply is single phase, 230V, 50Hz system



7. Three resistors of value 10Ω, 20Ω and 30Ω are connected in R, Y, and B phase respectively in a star connected 3-phase AC supply system of 400V, 50Hz. Calculate the current in each phase, neutral current and the active power consumed in each phase.

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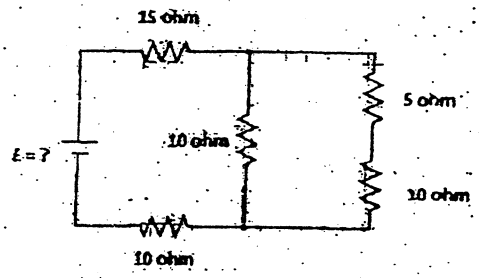
93 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. The voltage drop across 5 Ω resistor is 10 V. Calculate the current through each resistor and e.m.f of the battery. [4]



2. Discuss various factors which have to be considered while designing flood lighting scheme. [4]
3. In a street light scheme, two lamps 500 c.p and 750 c.p are installed in the road. Height of the lamp posts are 6m and 9m respectively. Calculate the light intensity on foot of the lamp posts and centre of the lamp posts, if distance between two lamp posts is 30 m. [5]
4. A cement factory of size 30m × 15m is to be illuminated by fluorescent lamp. Inside the room an average illumination of 120 lm/m^2 is to be provided on the working plane. Taking a coefficient of utilization of 0.8 and maintenance factor of 0.7 and lamp efficiency is 100 lm/watt for 80 Watt LED down light. [12]
   a) Calculate the number of luminaries required.
   b) Draw single line diagram showing arrangement of luminaries required, switches, power sockets. Decide the light and power sub-circuits, design distribution board, if the supply system is 3-phase 4 wire system, 400V, 50 Hz.
5. Explain the importance of earthing system in a building electrical installation. Write different types of earthing. Explain briefly any type of earthing with sketch. [4]
6. Calculate the size of copper cable for a single phase circuit of 230V, 10 HP motor, with power factor of 0.8, at 55 meter distance from the supply end. The permissible voltage drop is 2% of rated voltage. [5]

Cross sectional Area Sqmm	1.5	2.5	4	6	10	16	25	50
Current Rating (Amp)	13	18	20	30	40	50	70	90

7. Three resistors of value 10 Ω, 15 Ω and 20 Ω are connected in R, Y and B phase respectively in a star connected 3-phase AC supply system of 400 V, 50 Hz. Calculate the current in each phase, neutral current and the active power consumed in each phase. [6]

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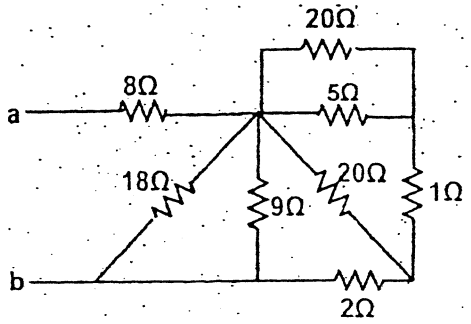
13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Service II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Find equivalent resistance across R_{ab} for the circuit shown in figure below. Calculate the current in each resistor and total power consumed by the circuit. [8]



2. Three resistive load of 10 Ω, 18 Ω and 12 Ω is connected between the R, Y and B phase of a star connected load respectively, the three phase supply voltage is 400 V. Find the current in each phase, neutral current and the power absorbed. [8]
3. The assembly hall of a college building 40 m× 25 m× 9 m is to be illuminated by twin fluorescent tube of 36 W, an average illumination of 300 lum/m^2 is to be provided on the working plane. The walls and ceiling are brightly painted. Draw layout diagram of light fixtures, switches, Power socket and distribution board. Decide the number of light and power sub-circuit and the supply is 3-phase 4 wire system. Assume suitable value for utilization and maintenance factor and lamp efficiency is 60 lum/watt. [12]
4. a) Calculate the appropriate size of Cu cable of single phase circuit of 230 V connecting two loads. Loads are 12kW heater at a distance of 80 m from the supply end and one 8 KW motor at a power factor of 0.8 lagging at a distance of 65 m from the supply end. The permissible voltage drop is 2% of the rated voltage. [6]

Necessary table is given below:

Cross sectional area in sq mm	1	1.5	2.5	4	6	10	16	25	50
Current rating Amp	10	13	18	20	30	40	50	70	90

b) Describe briefly with sketch how MCB Miniature Circuit Breaker Protect Electric circuit. [6]

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. A circuit, containing of three resistances 12 Ω, 18 Ω and 36 Ω respectively joined in parallel, is connected in series with a fourth resistance. The whole is supplied at 60 V and it is found that the power dissipates in the 12 Ω resistance is 36 W. Determine the value of the fourth resistance and the power dissipated in each resistance. [8]
2. A three phase star connected system with 230 V between each phase and neutral has resistance of 4, 5 and 6 ohms respectively. Estimate the current flowing in each phase and neutral current. Find the total power absorbed. [8]
3. a) What is the main objective of an equipment earthing? Explain various factors affecting the earth resistance. [4]
   b) Calculate the size of the earth electrode for plate earthing system, if the soil resistivity is 60 Ω-m and required earth resistance is 8 Ω. [4]
4. a) A production room of a factory size of 27 m × 45 m is to be illuminated by 125 watt metal hilide lamp. Inside the room an average illumination of 150*lm*/m^2 is to be provided on the working plane. Calculate the no. of lumineries required to be filtted in the room. Draw single line diagram showing arrangement of lumineries, switches, power sockets. Decide the light and power sub-circuits, design distribution board, if the supply system is 3-phase 4 wire system, 400 V, 50 Hz and the lamp efficiency is 115 *lm*/watt. [12]
   b) Calculate the size of common copper cable for load 1 KW heater and 1.5 HP motor both at a distance of 45 m with a permissible voltage drop of 2%, supply voltage is 250 V, 50 Hz. Assume suitable necessary data if required. [4]

Cross sectional area in sq mm	1	1.5	2.5	4	6	10	16	25	50
Current rating (A)	10	13	18	20	30	40	50	70	90

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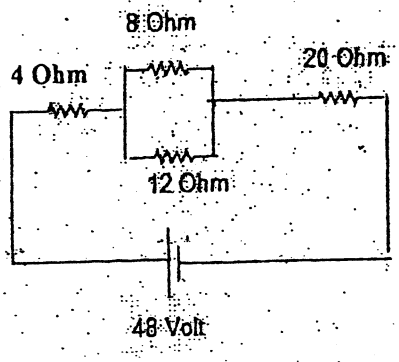
13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

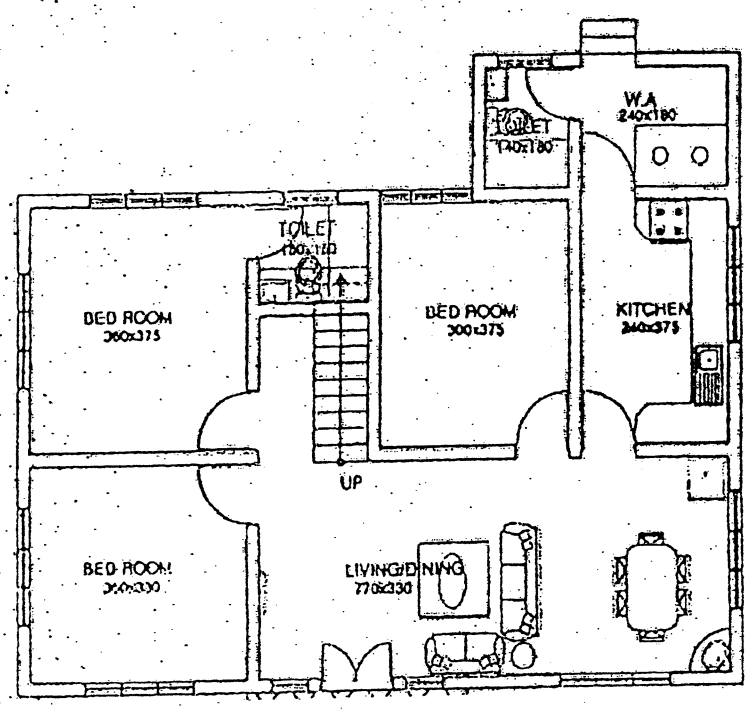
Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Calculate the current flowing through battery, 8 Ohm resistor, 12 Ohm resistor, Voltage drop across 20 Ohm resistor and power consumed by 8 Ohm resistor. [8]



2. For the given building, design: (a) Electric lighting and power system separately (b) Draw layout diagram of showing lamps, switches, power points and distribution board (c) Decide the number of light and power sub-circuit (d) Detail diagram of distribution board. If the supply is 1-phase, 230 V, 50 Hz system. [16]



Dimension in cm

3. What does mean by earthing electrode, earthing system and earthing resistance? How safety could be ensured by equipment earthing? [8]
4. With the help of neat sketch explain the operating principle of miniature circuit breaker. What does mean by rupturing capacity of protecting device? [8]

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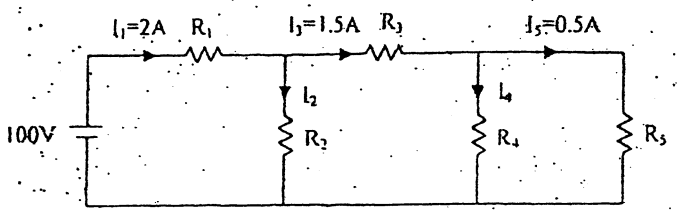
13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Find the resistance in the network shown in figure below, if power dissipation in R_2 and R_4 are 75W and 30 W respectively. [8]



2. What are the design process for lighting installation of a commercial building? [10]
3. Explain the line & phase voltage and balanced & unbalanced loads in three phase AC system. [6]
4. Explain with the help of necessary diagram and electric circuit, how can you adjust the temperature inside the refrigerator? [8]
5. How the value of earthing resistance could be kept low? And why? [8]

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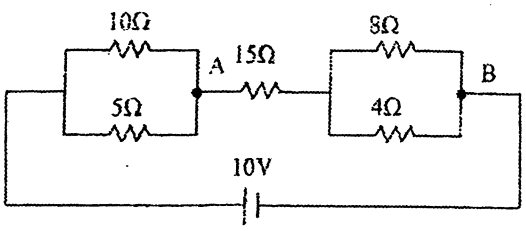
13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. In the given circuit, find the current through the battery and in each element. Also determine power dissipated on 15Ω resistor and the voltage drop between points A and B. [8]



2. A banglow of 12m×10m coverage area consisting three bed rooms, one living room, one kitchen and dining and two toilets. Design: [16]
   i) Electric lighting and power system separately
   ii) Draw layout diagram of showing lamps, switches, power points and distribution board
   iii) Decide the number of light and power sus-circuit
   iv) Detail diagram of distribution board, if the supply is 1-phase, 230V, 50 Hz system
3. a) Describe the operating principle of MCB. What are its advantage over fuse? [3+2]
   b) What are various methods of earthing? Explain briefly any one of them. [3]
4. a) Determine the appropriate size of copper cable for a single phase circuit of 230V, 18kW load at 50 meter distance from the supply end. The permissible voltage drop is 2% of rated voltage. [4]

Cross sectional area Sqmm	1.5	2.5	4	6	10	16	25	50
Current Rating (Amp)	13	18	20	30	40	50	70	90

   b) Describe in brief the window type air condition system. [4]

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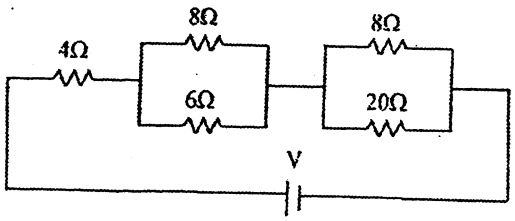
13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1) The current in the 6Ω resistor of the network shown in the given figure is 2A. Find the current in all other resistors, and the voltage V across the network [8]



2) Design electrical layout for a hall of 15m x 6m x 4.5m height. Assume an illumination of 300 lumen/m^2 is to be provided in hall. Decide with logic the light and power sub-circuit, draw a neat diagram showing the position of switches and distribution board, if 2x40W FTL luminaries with light efficiency is 70 lumen/watt and 3 phase supply system, 400V, 50 Hz system is used. The hall is to be fitted with fan, light and power points. Make your own assumption for missing data. [12]

3) Three resistors of value 20Ω, 30Ω and 10Ω are connected in R, Y, and B phase respectively in a ⅄ connected 3-phase AC supply system of 400 V, 50 HZ. Calculate the current of each phase, neutral current and total power consumed by the load. [6]

4) Calculate the number of lifts for a 7 floor office building, which is located at center of the city and total rentable area of the building above ground floor is 3500m^2. The height between two floors is 3.5m. The time for synchronizing the lift cars at ground floor is 30 sec and above the ground floor are 10 sec. It is required to empty the building in one hour. Consider the given specification: a) Capacity of lift car is 15 person b) speed of the car is 105m per minute, c) Rentable area per person is 10m^2 and d) estimated stops are 1 stop each 10m above ground floor. [8]

5) Explain the necessity of earthing system. How safety could be ensured by equipment earthing? [6]

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INSTITUTE OF ENGINEERING

Examination Control Division

2070 Ashad

Level	BE	**Full Marks**	40
Programme	B. Arch.	**Pass Marks**	16
Year / Part	III / I	**Time**	1½ hrs.

Subject: - Building Service II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Find the equivalent resistance between the terminal A and B of the network of figure1 shown below. [4]

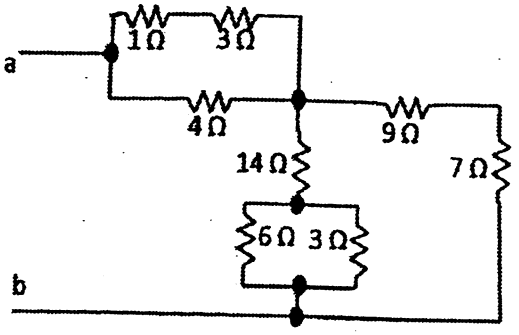


Fig 1

b) A coil of copper wire has a resistance of 90Ω at 20°C and is connected to a 230 V supply. By how much the voltage must be increased in order to mainttain the current constant if the temperature of the coil rises to 60°C. Take temperature coefficient of resistance for copper wire is 0.00428 from 0°C. [4]

2. a) What are the laws of illumination? Explain. [4]

b) A single phase 50 Hz motor takes 20A current at 0.75 power factor lagging from a 230 V sinusoidal supply. Calculate the kVAR and capacitance of capacitor to be connected in parallel to raise the power factor to 0.9 lagging ? [4]

3. A hall 30m by 15m with a ceiling height of 5m is to be provided with a general illumination of 120 lux. Taking a coefficient of utilization of 0.5 and depreciation factor of 1.4, determine number of lamps with suitable rating. Take luminous efficiency of lamp as 40 lumen/watt. Show the disposition and sketch of lamps on the hall. [8]

4. a) What is electrical shock? How does lighting arrestor work? Explain with diargam. [8]

b) Calculate the appropriate size of copper cable for a single phase circuit of 230 V connecting the following loads. The loads are 15 kW and 20 kW heaters at a distance of 75m and 100m from a supply end and 10 horse power motor operating with 0.8 power factor at a distance of 80m from the supply end. The permissible voltage drop is 2% of rated voltage and the necessary table is given below. [8]

Table for question no. 4 (b)

cross-sectional Area,mm 2	1	1.5	2.5	4	6	10	16	25	50
currentrating (A)	10	13	18	20	30	40	50	70	90

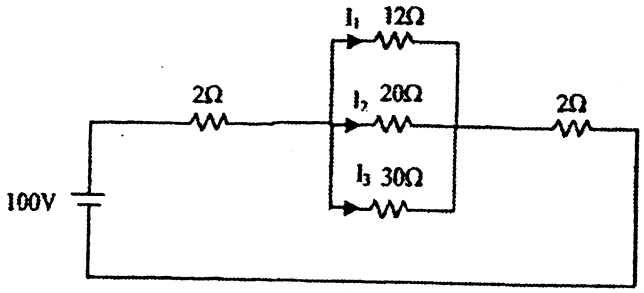
13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	4 0
Programme	B. Arch.	Pass Marks	1 6
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Building Services II *(EE604)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

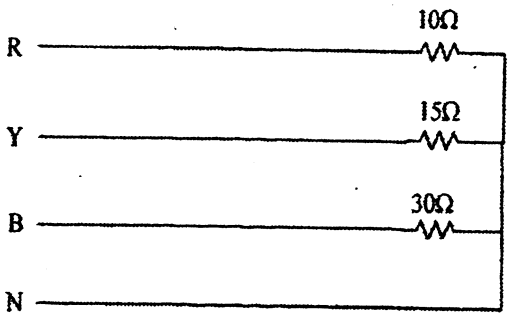
1. a) Determine the current flowing in the branches I_1, I_2, and I_3 as shown in fig below. [4]



b) A lamp of 400 CP is suspended at height of 5 meters above the centre of a circular disc of 5 meters diameter. Determine the illumination at the centre and periphery of the disc. [4]

2. A drawing hall measuring 30m x 8m is to be provided with illumination of 400 lux, assuming a coefficient of utilization is 0.8 and depreciation factor is 1.2 draw a layout diagram showing with luminaries and switches.If the lamps are using 36 W of FTL with efficiency of 70 lumen/watt. Design subcircuits and SDB, if supply system is 3 phase, 400V, 50Hz system. [8]

3. In the given circuit, calculate the current through the neutral wire and total power consumed by the circuit, if the supply voltage is 400V, 50Hz system. [8]



4. a) State the various types of protection system used in building, explain each of them briefly. [4]

b) Write the importance of equipment earthing system in an electrical installation for building .It is required to 8Ω earth resistance in a system. If the soil resistivity is 40 Ω-m, calculate the size of plate earth electrode. [4]

5. a) Explain the different types of electric wiring system. Which type of wiring system is mostly used nowadays? [4]

b) Discuss the various types of building heating system, using electrical energy. [4]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture (*AR 602*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. How did the industrial revolution bring about changes in the field of engineering and the building industry in the context of Europe? Explain using examples. [16]
2. Discuss and compare Modern and Post-Modern Architecture giving examples. Discuss in detail of one architectural project of Robert Ventury under Post-Modernism. [10+6]
3. Write about the contributions and works of the Indian Architects, B.V. Doshi and Charles Correa with the help of sketches. [8+8]
4. Explain what you understand by the term Sustainable Architecture? Describe with the works of any two contemporary architects. [6+10]

OR

How do you explain the role of some pioneers like G.D Bhatta, S.N Rimal, Carl Pruscha and Robert Wiese in the development of modern architecture in Nepal?

5. Write short notes on: (Any Four) [4×4]
   a) Expressionism
   b) Santiago Calatrava
   c) Deconstructivism
   d) Russian Constructivism
   e) Tadao Ando

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR 602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain the architectural movements called [8+8]
   a) Romanticism
   b) Expressionism
2. Explain the movements [8+8]
   a) De Stijl
   b) Russian Constructivism
3. Write about the contributions and works of the Indian Architects, B.V. Doshi and Charles Correa with the help of sketches. [16]
4. Explain what you understand by the term Sustainable Architecture. Describe with the works of any two contemporary architects. [16]

OR

How do you explain the role of some pioneers like G.D Bhatta, S.N Rimal, Carl Pruscha and Robert Wiese in the development of modern architecture in Nepal?

5. Write short notes on: (Any Two) [2×8]
   a) Futurism
   b) High Tech Architecture
   c) Deconstructivism
   d) "Form Follows Function"

***

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR 602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. With the works by Bruno Taut and Erich Mendelsohn, explain the movement expressionism in architecture. Elaborate on the characteristics of Bauhaus with examples of work by Walter Groupius and Mies Van der Rohe. [8+8]
2. Explain the 'Chicago School of Architecture' highlighting its distinctive features in the design of skyscrapers. 'Post Modern architecture is a reaction to Modern architecture'; explain. [8+8]
3. What is the relationship between architecture and climate in terms of sustainability in architecture? Explain the term 'High Tech Architecture' with relevant examples. [8+8]
4. Highlight the contribution of the first Nepalese architect to contemporary Nepalese architecture. Also explain the work by Robert Weise and Carl Pruscha that have contributed to contemporary Nepalese architecture in terms of context and material. Explain with necessary examples and sketches. [16]
5. Write short notes on: (Any two] [2×8]
   a) ZahaHadid
   b) Russian constructivism
   c) Kenzo Tange

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94 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Ashwin

Exam.	Back		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Explain the historical background and the principal architectural achievements of the Chicago School. Illustrate with works of its main architects. [16]

OR

Write an introduction to Art Nouveau. Explain Art Nouveau is known in various guises with frequent localized tendencies giving examples of works of its principal architects and characteristics.

2. Compare and contrast International Style and Post Modern Architecture. With Robert Venturi's famous saying "less is bore" describe the characteristics of Post-Modern Architecture. Support your answer with examples and sketches. [6+10]
3. Explain what you understand by the term Sustainable Architecture? Describe with the works of any two contemporary architects. [16]
4. How do you explain the role of some pioneers like G.D Bhatta, S.N Rimal, Carl Pruscha and Robert Wiese in the development of modern architecture in Nepal? Also explain any one contemporary building of current practices. [10+6]
5. Write short notes on: [4×4]
   a) Construction Technology in Industrial Revolution
   b) Louis I Kahn
   c) De Stijl movement
   d) Renzo Piano

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BAE	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR 602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *All questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*
- ✓ *Use sketches to illustrate your answer.*

1. Describe and explain the movements called The First and the Second Chicago School.
2. Explain the movement called Expressionism in architecture.
3. Compare and contrast: Modernism versus Post-Modernism in architecture.
4. Explain the rise of modern architecture in Nepal after 1950 A. D.

   Or,

   Describe and explain Sustainable Architecture.
5. Write short notes on: *(Any Two)*
   a) Changes in the building industry after the industrial revolution.
   b) Baushus Movement in architecture.
   c) Deconstructivism in Architecture.

***

94 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain Bauhaus Movement and International Style with supporting sketches. [8+8]
2. Write about the contribution of CHICHAGO School and DE STIJL movement in architecture. [8+8]
3. What do you understand by the term "sustainable architecture"? Describe with the works of any two contemporary architecture. [16]
4. Discuss ideas, theories of architecture of the following architects. (Any two) [8+8]
   a) Tadao Ando
   b) Michael Graues
   c) Zaha Hadid
5. Briefly explain the role of pioneer architects in modern Nepal, post-1950 A.D. Also explain the concepts and prectices of any two contemporary architects of Nepal. [10+6]

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Describe how the Industrial Revolution brought about changes in the building industry. [16]
2. What were the First Chicago School and the Second Chicago School? Explain with examples. [16]
3. Compare Modern and Post Modern Architecture, with examples. [16]
4. Explain the movement called

14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. How did the industrial revolution bring about changes in the field of engineering and the building industry in the context of Europe? Explain using examples. [16]
2. What was the Chicago school? Explain using examples. [16]
3. Why is Art Nouveau known as 'total style'? Elaborate your answer with examples. International style was a reaction to over-elaborations to architecture as seen in the late 19th century. If this is the case, what are the major distinctions between Art Nouveau and international style? [8+8]
4. What do you understand by the term Sustainable Architecture? Describe using examples. [16]

OR

Explain the development of Modern Architecture in Nepal after 1950, it characteristics, the architect and their works.

5. Write short notes on: (any two) [8+8]
   a) Expressionism
   b) Santiago Calatrava
   c) Deconstructivism

***

14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. What impacts do you think have industrial revolution made in contemporary architecture? With examples of work by Henry Hobson Richardson explain Romanticism. What are the differences and similarities between Bauhaus and International Style. [4+8+4]
2. What was the movement called Art Nouveau? Who were the architects of this movement, and what were their important works? [16]
3. What was the movement called Post-Modern architecture? Who were the chief architects of this movement? Describe, using examples of their buildings. [16]
4. What was the movement called Russian Constructivism? Describe with the names of architects and their projects. [16]
5. How do you explain the role of some pioneers like G.D Bhatta, S.N Rimal, Carl Pruscha and Robert Wiese in the development of modern architecture in Nepal? [16]

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt All questions.*
- *All questions carry equal marks.*
- *Assume suitable data if necessary.*
- *Make sketches to illustrate your answers where as appropriate.*

1. Explain the architectural movement of BAUHAUS. What were the contribution done by Walter Gropius, Mies Van de Rohe and Hannes Meyer in BAUHAUS movement?
2. Write about DE STIJL and Amsterdam school, how did they impact the contemporary architecture?
3. Explain Russian Constructivism. Outline the main features of Sustainable Architecture and Hi-tech Architecture.
4. Elaborate ideas and philosophies of any two Architects. Illustrate with their two projects.
   a) Alvar Aalto
   b) Charles Correa
   c) Norman Foster
   d) Tadao Ando

   Write reference to any completed building project, Discuss the ideas and contribution of Bhibhiti Man Singh (TECHNICAL INTERFACE) for development of contemporary nepalese architecture.

OR

5. In your opinion, which Architect has played important role in contemporary architecture of Nepal? Explain with supporting reasons.

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain the historical background and the principal architectural achievements of the Chicago School. Illustrate with works of its main architects. [16]
2. Discuss and compare between Art Nouveau and De Stijl? Who are the principle architects of the two movements? Explain their philosophies. [16]
3. Why was the ideas of Russian Constructivism not easily accepted by the people? With Robert Ventury's famous saying "less is bore" describe the characteristics of Post-Modern Architecture. Support your answer with examples and sketches. [6+10]
4. Describe the development of modern architecture in Nepal from the 1940's to the 1970's giving examples of architects and their works. [16]
5. Write short notes on: (any two) [8+8]
   a) Alvar Aalto
   b) Post Modernism
   c) Tadao Ando
   d) Dynamic Architecture

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Describe the industrial revolution in Europe and America and its impact on the subsequent development of architecture. [16]
2. What was the movement called Art Nouveau? Explain using the works of concerned architects. [16]
3. Discuss and compare Modern and Post-Modern Architecture giving suitable examples. [8+8]
4. Write about the contributions and works of the Indian architects, B.V Doshi and Charles Correa with the help of sketches. [16]

OR

Explain the sequential (from early to later) development of modern architecture in Nepal after 1950, using examples of architects and their works.

5. Write short notes on: (any two) [8+8]
   a) Expressionism in Architecture
   b) Futurism
   c) Sustainable Architecture

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What were some of the social, economic and technical factors that gave rise to the development of a new architecture after the industrial Revolution in Europe and USA? Illustrate with some examples of these early works of engineering and architecture. [16]
2. What was the Chicago School of architecture? Explain with some examples of the key architects involved, and some of their buildings. [16]
3. What was the Bauhaus Movement? Explain using the works of some of the architects to illustrate. [16]
4. Explain the design philosophies and some of the works, of architects Charles Correa and Alvar Aatto. [8+8]

OR

Explain the development of Modern Architecture in Nepal after 1950 A.D., using examples of some key architects and their buildings. [16]

5. Write short notes on: (any two) [8+8]
   a) Russian Constructivism
   b) High-Tech Architecture
   c) Sustainable Architecture

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Contemporary Architecture *(AR602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*
- ✓ *You may use sketches to help illustrate your answer;*

1. What was the movement called Expressionism in architecture? Explain and illustrate with some examples. [16]
2. a) What was the Arts and Crafts Movement? [4]
   b) Explain the Art Nouveau Movement, using examples of architectures and their works. [12]
3. Explain what you understand by the term Sustainable Architecture. [16]
4. Explain the design philosophies and some of the works, of architects kenzo Tange and Oscar Niemeyer. [8+8]

OR

Explain the rise of modern Architecture in Nepal after 1950 A.D; its new characteristics and features, using examples of some key architects and their buildings. [16]

5. Write short notes on: (any two) [8+8]
   a) De stijl
   b) Louis kahn
   c) Richard Rogers

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