

Khulna University of Engineering and Technology
 Department of Architecture
 B.Arch 3rd Year 1st Term Regular Examination, 2019
 Arch 3131- Modern Architecture

Full Marks : 210

Time : 3 Hours

- N.B i) Answer any three questions from each section in separate script.
 ii) Figures in the right margin indicate full marks.



Section A

- | | | |
|------|--|------|
| 1.a. | How the Chicago School of thought changed the development pattern of architecture after ending classical regime. | 15 |
| b. | Interpret your understanding about the concept of Rational Thought in architecture | 20 |
| 2. a | Discuss the underlying phenomenon behind the development of Arts and Crafts during industrial revolution. | 15 |
| b. | Critically illustrate the concept Material Aestheticism came as a language to define beautification in architecture. | 20 |
| 3.a | Elucidate the term Domestic Architecture under five points of Le Corbusier. | 20 |
| b. | What were the common features of Tall Buildings developed at early 1875-1925 | 15 |
| 4.a. | Define modernism under the credo Truthfulness of Form, Material and Expression | 15 |
| b. | Write short notes (any two) | 2x10 |
| | i. Louis Sullivan | |
| | ii. Ecole des Beaux-Arts | |
| | iii. Frank Lloyd Wright | |

Section-B

- | | | |
|-------|--|------|
| 5.a | What were the media of Modern Architecture in India | 10 |
| b. | Name the early school of Art established in British period. Write short notes on any two of the school. | 25 |
| 6.a | Write down the design principles of Chandigarh designed by Le Corbusier with proper illustrations. | 20 |
| b. | 'Villa Shodhan is considered to be more reformed version of Villa Savoye'- Explain | 15 |
| 7.a. | How Bawa's tropical urban house offered a new concept of urban living in dense tropical cities? Explain with necessary sketches. | 15 |
| b. | Give a short account of P.B.S Headquarters designed by Habib Fida Ali and his perception of modernism in context of Karachi. | 20 |
| 8. a. | Explain different phases of architectural style observed in Mazharul Islam's work. | 15 |
| b. | Write short notes on- | |
| | i. Brutalism | 2x10 |
| | ii. Indo- saracenic architecture. | |

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 3rd Year 1st Term Regular Examination, 2019

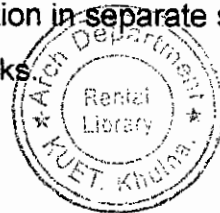
Course no: EEE-3125 Course title: Electrical Installation in Building

Full Marks: 210

Time: 3 Hours

- N.B i) Answer any three questions from each section in separate script.
ii) Figures in the right margin indicate full marks

Section-A



1. a) What are the active and passive elements in an electrical circuit? Classify the electrical source with proper symbol. 10
b) State KVL and KCL. Find V_1 and V_2 in the circuit shown in Fig. 1(b). Also calculate I_1 and I_2 , and the power dissipated in the 10Ω resistor. 12
c) Define bilateral circuit for the bridge network K as shown in Fig. 1(c). Find R_{ab} and i . 13
2. a) Define power and energy. How much energy (in KWh) is required to light a 60w bulb continuously for 1 year (365 days) 06
b) A battery of unknown e.m.f is connected across resistances as shown in Fig. 2(b). The voltage drop across the 8Ω resistor is 20v. What will be the current reading in ammeter? What is the e.m.f of the battery? 12
c) Using branch-current analysis, find the current through each resistor for the network shown in Fig.2(c) 17
3. a) Using superposition theorem, determine the current through the 4Ω resistor of Fig. 3(a) 14
b) State Thevenin's theorem. Find the Thevenin's equivalent circuit for the network external to the resistor R of Fig. 3(b) 13
c) What are the different sources of renewable energy usable in house-building? Show the layout of a solar Pv system. 08
4. a) What is alternating current? Compare alternating current with direct current. 07
b) Define power and reactive power. Show that the real power consumed by a purely inductive load is zero. 07
c) Calculate the RMS and average voltage of the following output signal. Fig. 4(c) 14
d) What is an electrical substation layout? What are the different types of substation layout? Show schematically. 07



Section-B

5. a) Define illuminance. State and explain Lambert's cosine law. 07
b) Explain the working principle and connection diagram of fluorescent tube with neat sketches. 12
c) Define –(i) Space-height ratio (ii) Utilization factor (iii) Depreciation factor 06
d) It is desired to illuminate a drawing hall with an average illumination of 200lux. The hall is 30X20 m². The lamps are to be fitted 4m from ground floor. Find the number of lamps and wattage/lamp for the lighting scheme. Given efficiency of the lamps available as 25 lumens/watt, depreciation factor 0.8 and coefficient of utilization 0.75, space height ratio between 0.8 and 1.2. Give satisfactory spacing arrangement. 10
6. a) What is current rating of cable? Mention differences between wire and cable. 07
b) Explain distribution wiring system with a neat connection diagram. What are the advantages and disadvantages of distribution wiring system compared to tree system? 11
c) Define stranded cable and SWG. 05
d) A room is to be wired for single phase AC supply from mains which has declared voltage of 220 volts. The length of the wire from the main switch to light and plug points is 30m. If the wire is to carry 5amps, determine the size of conductor. 12
7. a) What are the conventional systems of wiring? What are the factors to be considered to select appropriate wiring system? 10
b) Classify conduit wiring system. Mention the advantages and disadvantages of conduit wiring system. 10
c) The electrical installation plan of a bedroom is given in Fig. 7(c). Draw the conduit run and electrical wiring diagram for both light circuit and power circuit of this plan. 15
8. a) Draw the floor plan of primary school consisting of two classrooms, one teacher's room, one veranda and two toilets. 35
(i) Calculate the illumination of the floor plan.
(ii) Draw the electrical installation of this floor plan building according to calculated illumination.
(iii) Draw the conduit run and electrical wiring diagrams for both light and power circuits according to the installation plan.
(iv) Calculate the load and determine the conductor size.
(v) Finally estimate the quantity of conduit and wire of different sizes required for complete wiring of this building.

List of Figures

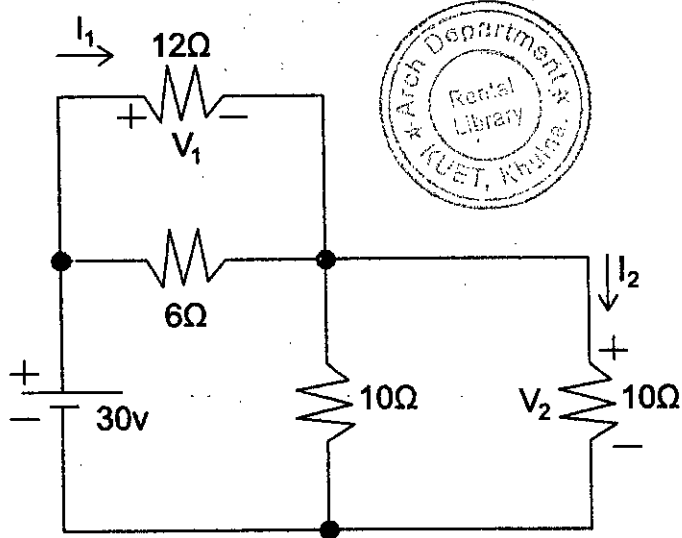


Fig. 1(b)

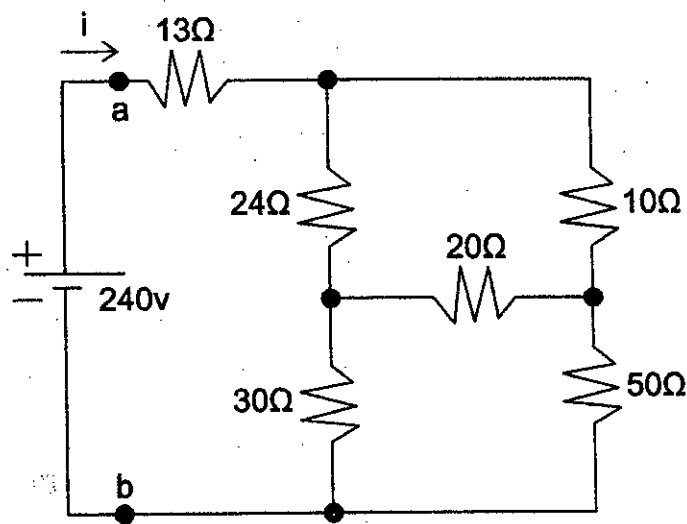


Fig. 1(c)

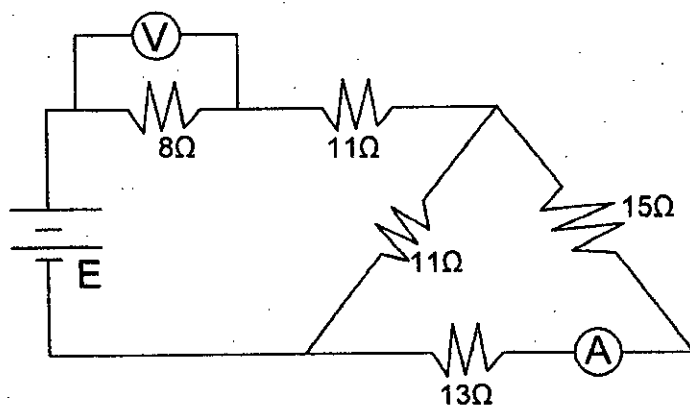


Fig. 2(b)

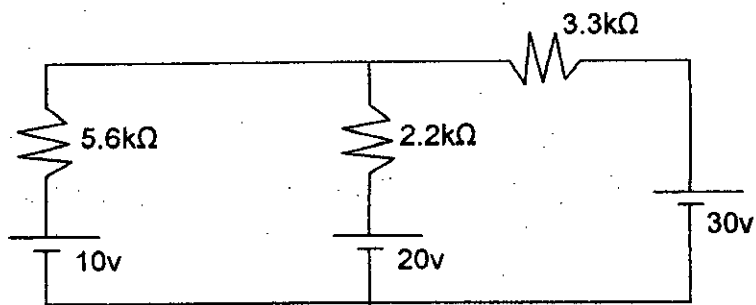


Fig. 2(c)

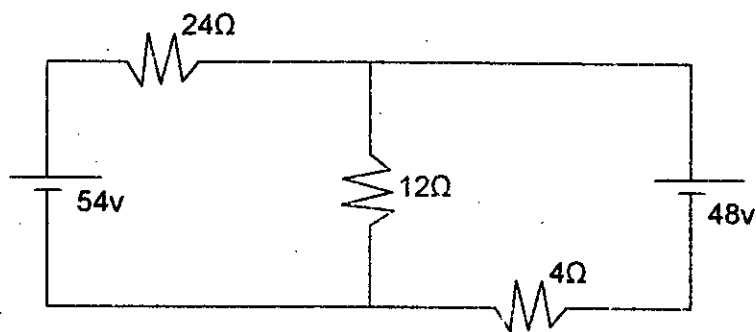


Fig. 3(a)

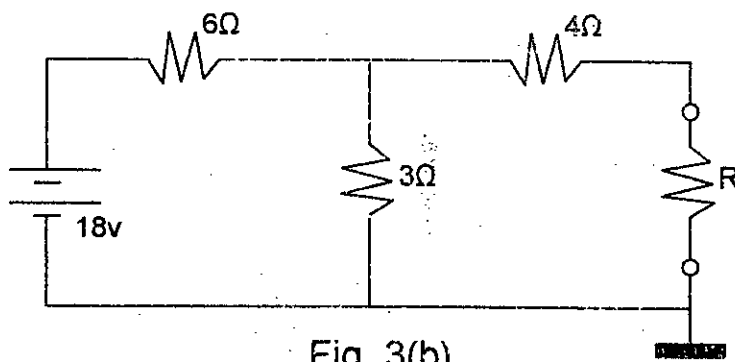


Fig. 3(b)

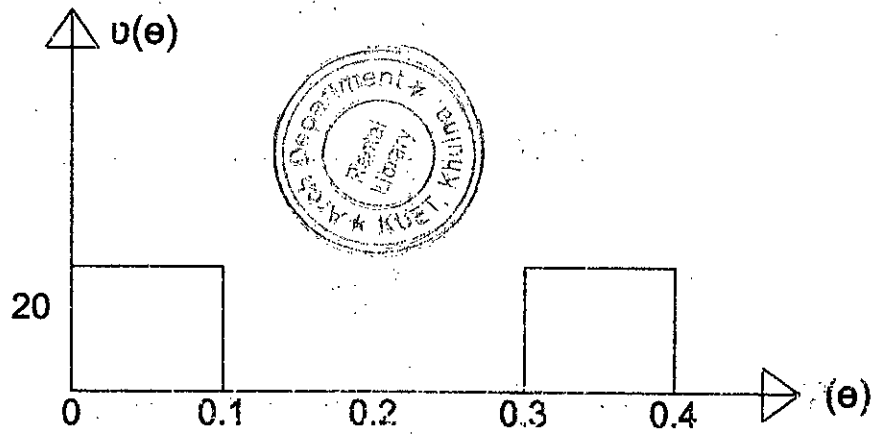


Fig. 4(c)

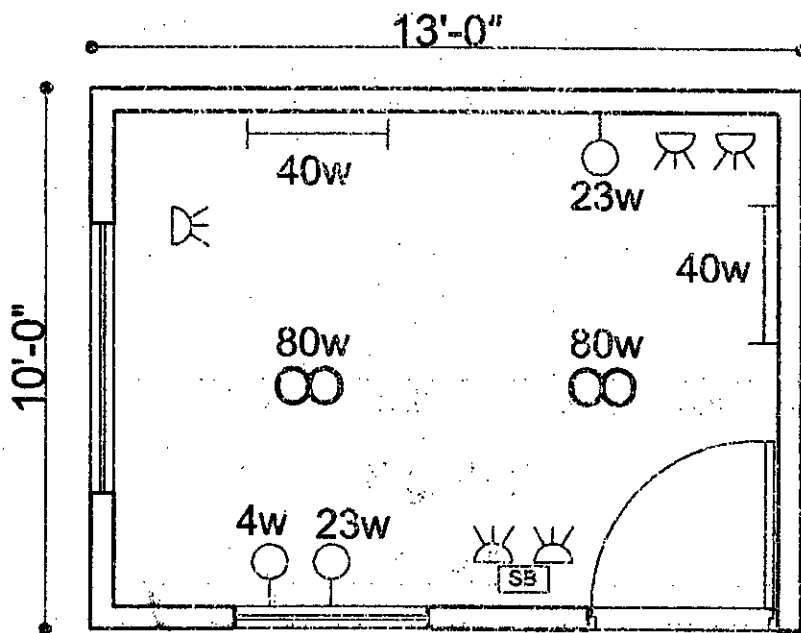


Figure 7 (C): Electrical Installation Plan of a Bedroom

Table 2: Luminous Efficiency of Conventional Electrical lamps

Type of Lamp	Wattage	Luminous Flux (Lumen)	Luminous Efficiency (Lumen/Watt)
Incandescent	40	430	10.7
	60	730	12.2
	100	1380	13.8
	500	8400	16.8
Fluorescent Tubes	20	940	47.0
	40	2400	60.0
	80	4350	54.4
High Pressure Mercury Vapour Lamp	80	3400	42.5
	250	12500	50.0
	1000	55000	55.8



Table 3: For Conductor Size Calculation

Current ratings and voltage drop for vulcanised rubber PVC or polythene insulated or tough Rubber PVC lead sheathed single core aluminium wires or cables

Size of Conductor		2 Cables d.c. or Single-phase a.c.		3 or 4 cables of bal. and 3-phase		4 Cables d.c.	
Normal area sq. mm.	Number and diameter of wire in mm.	Current rating in amperes	Approx. length of run for volt drop in metres	Current rating in amperes	Approx. length of run for 1 volt drop in metres	Current rating in amperes	Approx. length of run for 1 volt drop in metres
1.5	1/1.40	10	2.3	9	2.9	9	2.5
2.5	1/1.80	15	2.5	12	3.6	11	3.4
4.0	1/2.24	20	2.9	17	3.9	15	4.1
6.0	1/2.80	27	3.4	24	4.3	21	4.3
10.0	1/3.55	34	4.3	31	5.4	27	5.4
16.0	7/1.70	43	5.4	38	7.0	35	6.6
25.0	7/2.24	59	6.8	54	8.5	48	8.5
35.0	7/2.50	69	7.2	62	9.3	55	9.0
50.0	7/3.0	91	7.9	82	10.1	69	10.0
	19/1.80						



 01-07-2019
Protik Chandra Biswas
 Assistant Professor
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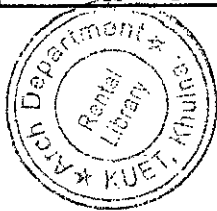


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1.5	1/1.40	10	2.3	9	2.9	9	2.5
2.5	1/1.80	15	2.5	12	3.6	11	3.4
4.0	1/2.24	20	2.9	17	3.9	15	4.1
6.0	1/2.80	27	3.4	24	4.3	21	4.3
10.0	1/3.55	34	4.3	31	5.4	27	5.4
16.0	7/1.70	43	5.4	38	7.0	35	6.2
25.0	7/2.24	59	6.8	54	8.5	48	8.5
35.0	7/2.50	69	7.2	62	9.3	55	9.0
50.0	7/3.0	91	7.9	82	10.1	69	10.0
	19/1.80						

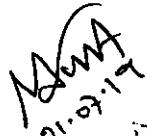

 01-07-17
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Table 1: Illumination Required for Various Purposes

0.1 to 5 Ft. Candle	10 Ft. Candles	15 Ft. Candles	20 Ft. Candles	30 Ft.-50 Ft. Candles	Above 50 Ft. Candles
Corridors, Stair case, Storage Toilets, Auditoriums, Cinemas, Dancing Halls, Night clubs and Bars, Railway platforms and Hospital wards.	Restaurants, Lunch Rooms, Cafeteria, Dining Halls, Conference Room, Reception Room, Waiting Room, Lobby and Museum etc.	Bank's Lobby, Railway Compartment, Street Lights.	For intermittent reading or writing, Filing clerk or Dastri's room, Store room of an industry offices, Class room, Library, Show-rooms, Kitchen and operating room.	Steno-Typist room, Design Cabins, Drawing rooms, Office, Bank Counter and desks.	Used for person work where minute adjustment and rapid discrimination is required.

Table 6.5

If the light requirement for reading a good print at 10 years of age is 1 unit, then

For	20 years of age	.....	1.5
"	30 years of age	.....	2.0
"	40 years of age	.....	3.0
"	50 years of age	.....	6.0
"	60 years of age	.....	15.0

Level of Illumination required for

Children upto	10 years of age	— 200 lux.
Men & Women upto	40 years of age	— 600 lux.
do- upto	60 years of age	— 3000 lux



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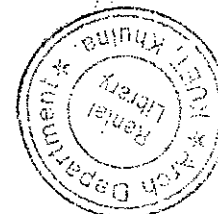
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Level of Illumination required for

Children upto	10 years of age	— 200 lux.
Men & Women upto	40 years of age	— 600 lux.
-do- upto	60 years of age	— 3000 lux

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Khulna University of Engineering and Technology

Department of Architecture

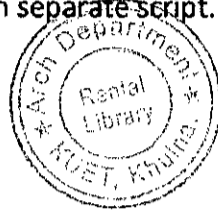
B.Arch 3rd Year 1st Term Regular Examination, 2019

Course no: 3125; Course title: Mechanical Equipments in Building

Full Marks: 210

Time: 3 Hours

- N.B i) Answer any three questions from each section in separate script.
ii) Figures in the right margin indicate full marks.



Section-A

1. a. Why should an architecture student need to study mechanical equipment? 10
b. What is meant by HVAC system? Describe the various components of a HVAC system with neat sketch. 16
c. Write short note on: 09
(i) EER (ii) BTU (iii) COP
2. a. What is meant by refrigeration? List the various applications of refrigeration system. 10
b. Describe the working principle of a vapour compression refrigeration system with necessary diagram. 15
c. Differentiate between vapour compression and vapour absorption refrigeration system. 10
3. a. Write short note on: 12
(i) Humidification (ii) Humidity (iii) Degree of saturation (iv) Psychrometry
b. What is meant by air conditioning? Describe the factors that affect human comfort. 08
c. Write down the name of different types of installation of air conditioner. Also explain split air conditioning system with neat sketch. 15
4. a. What is meant by district cooling system? Explain the working procedure of a district cooling system with neat sketch. 12
b. What are the advantages of district cooling system? 07
c. Explain the working principle of a chilled beam system. 10
d. Describe Air Handling Unit (AHU). 06

Section-B

5. a. Write short note on: 10
(i) Natural ventilation (ii) Artificial ventilation (iii) Air conditioning
- b. Describe about different types of air filters used in ventilation system. 10
- c. Why fans are necessary in ventilation system? Describe about different types of fans used in ventilation system. 15
6. a. Define vertical transportation. Classify vertical transportation used in modern building. 10
- b. Write down different types of staircases and their materials. Describe the requirements of a good stair. 17
- c. What is meant by ramp? Write down the application of ramp in modern building. 08
7. a. What is meant by elevator? Write down the factors upon which lift performance depends. 10
- b. Describe different types of roping used in elevator. 10
- c. Determine the upward and downward journey time of an elevator which is used in an eight floored building having 5m floor to floor spacing. Assume a car capacity of 7 persons and 4ms^{-1} speed of travel elevator is installed in that building. 15
8. a. Write down the advantages of hydraulic lifts. Discuss the maintenance procedure of elevators. 10
- b. What is meant by escalator? Briefly explain the major components of an escalator with neat sketch. 12
- c. Describe transportation capacity and arrangement of escalators. 13



Khulna University of Engineering and Technology
Department of Architecture
B.Arch 3rd Year 1st Term Regular Examination, 2019
Course no: CE-3125 Course title: Structure III –Reinforced Concrete Design

Full Marks: 210

Time: 3 Hours

- N.B
- i) Answer any three questions from each section in separate script.
 - ii) Figures in the right margin indicate full marks.
 - iii) Assume reasonable value for any missing data.

Section-A

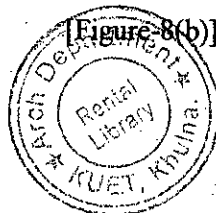


1. (a) Define one-way and two-way slab. Mention the function of steel in RCC structure. 08
(b) Differentiate between Working Stress Design (WSD) and Ultimate Strength Design (USD). 05
(c) Why temperature and shrinkage steel are provided in one way slab? Mention the ACI code specification. 07
(d) For the moments shown in figure below, calculate the amount of steel for the slab. Sketch the reinforcement detailing for the calculated area of steel using "straight bar". 15
[Figure-1(d)]
2. (a) Draw the deflected shape of structures mentioned below and draw their reinforcement placing qualitatively: 09
i) Simply supported beam, ii) Cantilever beam, iii) Both end fixed beam.
(b) A slab of width 1ft and clear span of 14 ft is to be designed for a village canal. Assume that the slab is simply supported and a concentrated load of 280 lb acts at the mid span as worst condition of loading in addition to its self-weight. Find thickness and amount of main reinforcement by WSD method. Show reinforcement detailing with neat sketch. $f_c' = 2500$ psi, $f_y = 50,000$ psi. 26
3. Design an interior panel of a two-way slab floor system with four ends continuous having panel of 19ft x 25ft, supported on beams having width of 1 ft. The service live load is to be taken as 70 psf and the service dead load consists of 25 psf of floor finish in addition to the slab weight. Use $f_c' = 3$ ksi, $f_y = 60$ ksi and the following co-efficients. Show reinforcement details. 35
 $C_a. neg = 0.069$ $C_a. dl = 0.028$ $C_a. ll = 0.045$
 $C_b. neg = 0.022$ $C_b. dl = 0.009$ $C_b. ll = 0.014$
4. (a) Why corner reinforcement is necessary? How is it placed? 08
(b) A simply supported rectangular beam 18 inch wide having an effective depth of 24 inch carries a service dead load of 2.80 kips/ft and a service live load of 3.80 kips/ft on a 20 ft clear span. If is reinforced with 7.62 in² of tensile steel which continues uninterrupted into the supports. Design the web reinforcement. $f_c' = 3500$ psi and $f_y = 50,000$ psi 27

Section-B

5. (a) Write own the advantage of reinforced concrete as a structural material. Show the variation of ϕ with net tensile strain ϵ_t for Grade 60 reinforcement. 10
- (b) Derive the expression, $M_u = \phi b d^2 f_y \rho (1 - \frac{\rho f_y}{1.7 f_c})$ where the symbols have their usual meaning. 12
- (c) Determine the ACI design moment capacity ϕM_n for the beam shown in figure below if $f_c' = 4000$ psi and $f_y = 60,000$ psi. 13
- [Figure-5(c)]
6. (a) Derive the steel ratio formula for a balanced beam. 13
- (b) Design a rectangular beam for a 22 ft simple span, if a dead load of 1 K/ft (not including the self weight) and a live load of 1.90 K/ft are to be supported. Use $f_c' = 4000$ psi and $f_y = 60,000$ psi. Show the reinforcement detailing. 22
7. (a) Distinguish between singly and doubly reinforced beam. 06
- (b) A rectangular concrete beam of width 10" has an effective depth to the tensile-steel centroid of 18 inch. Compression steel consisting of 2 Nos. #8 bars is located 2.5 inch from the compression face of the beam. If, $f_c' = 3$ ksi and $f_y = 60$ ksi, what is the ultimate moment capacity of the beam for tensile steel reinforcement of 3 Nos. #9 bars? 29
8. (a) What is the minimum percentage of steel, that should be provided for beam design according to ACI? 05
- (b) Determine the tensile steel required to resist $M_D = 200$ Kip-ft and $M_L = 425$ Kip-ft on a 18 ft long simply supported beam. Given that, $f_c' = 3000$ psi and $f_y = 60,000$ psi. 30

[Figure-8(b)]



List of Figures

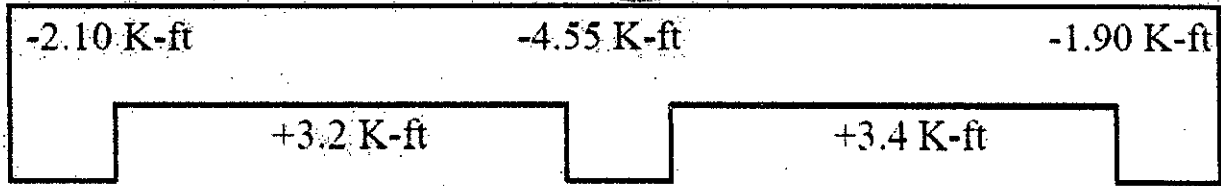


Figure for question No:1(d)

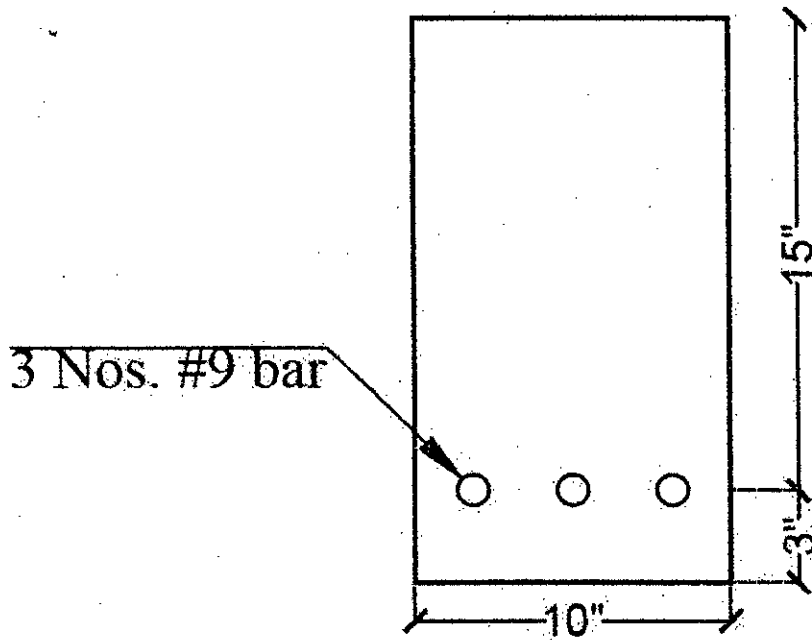


Figure for question No:5(c)

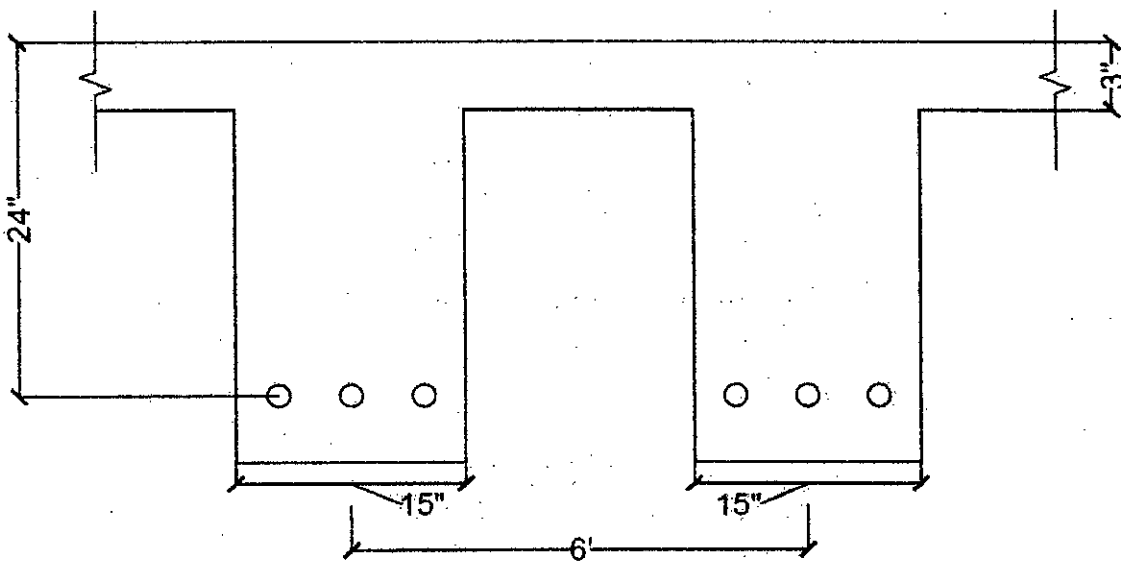


Figure for question No:8(b)