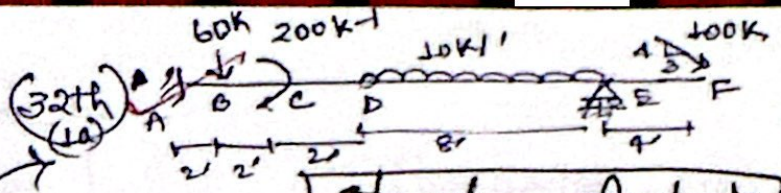
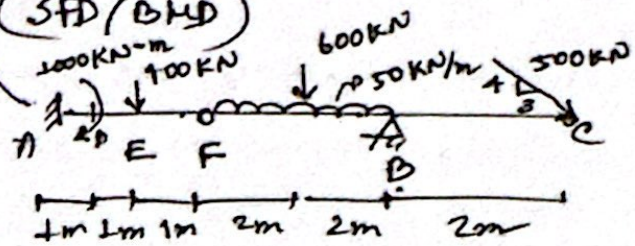


(32th) (14) (Q-14)

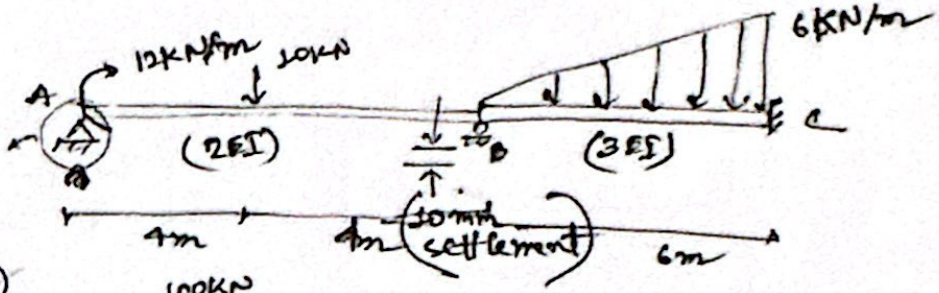
Structure Analysis

Beam (SFD/BMD)



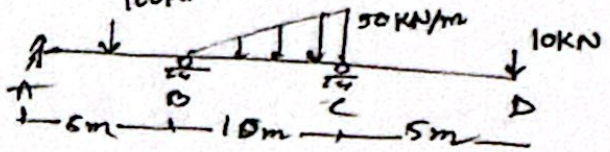
(41)(26) (D) draw SFD/BMD of beam

(40)(1) (D)



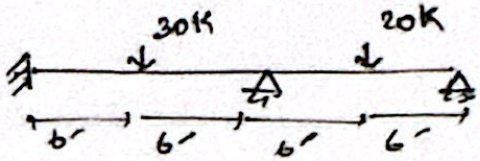
$E = 200$ GPa
$I = 200 \times 10^6$ mm⁴
solve beam draw SFD, BMD

(28)(18) (TD)



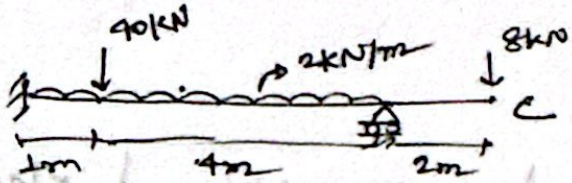
Draw (SFD/BMD)

(36)(1) (29)(32)



draw SFD/BMD

(31)(8) (L-1)



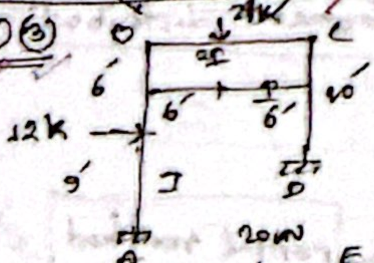
solve by consitent deformation method · deflection @ C

(portal frame) by force method — (a–11) → Roof pdf — pg 72

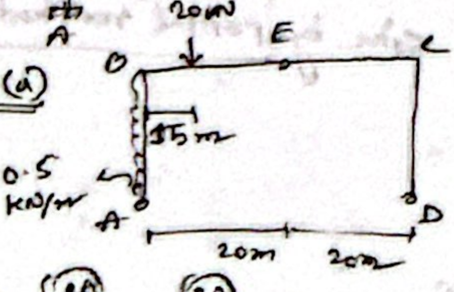
Frame (SFD/BMD)

(41)(3) . solve frame by slope deflection method

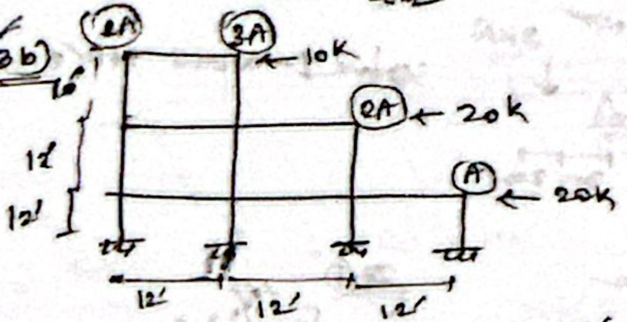
(29)(1) – solve by moment dist



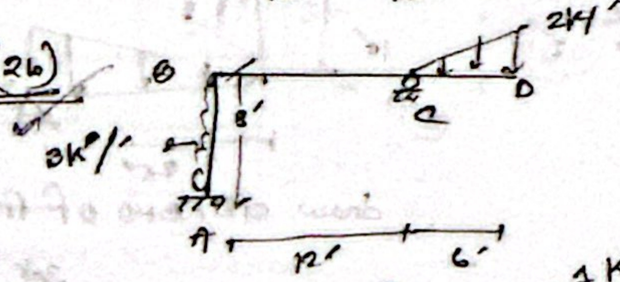
(41) 1(a) calculate reactive force & draw SFD / BMD of 3pinned portal



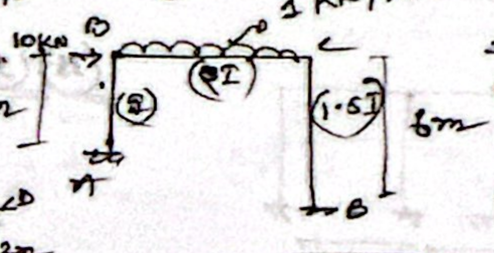
(40)(3b) solve frame by cantilever method draw SFD/BMD



(40)(2b) solve frame by slope deflection method, (EI) const

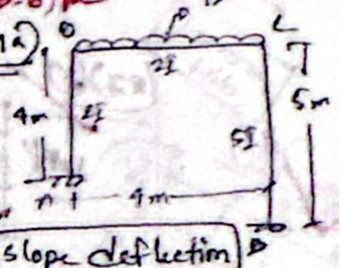


(38)(3) (Analyse frame)

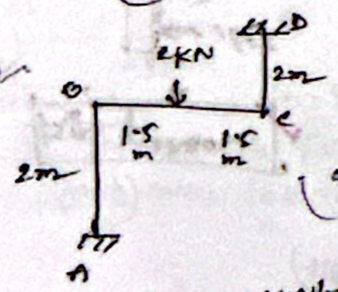


(30)(1a) (2.6)

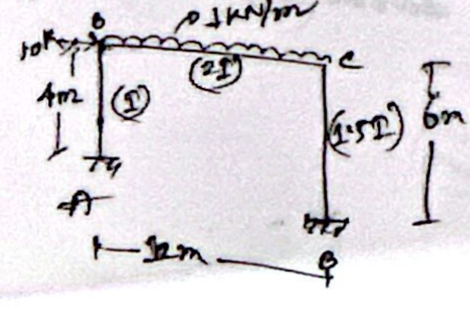
use slope deflection



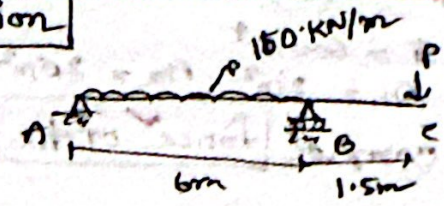
(37)(2) Draw SFD/BMD



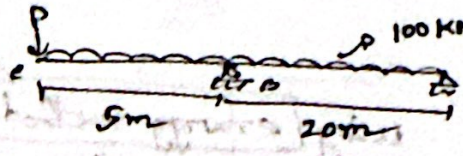
(37)(3)



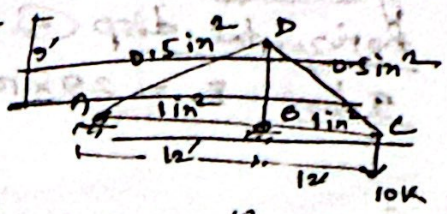
deflection

(41)(16) 

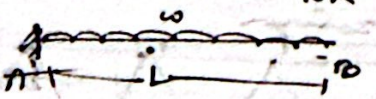
(for what value of (P) deflection = 0?)

(38)(24) 

(for which (P) deflection @ C = 0?)

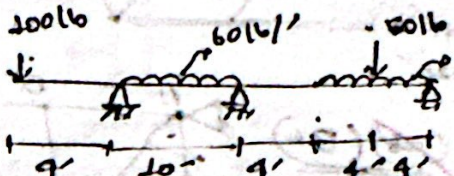
28(26) 

use energy method determine horizontal disp D

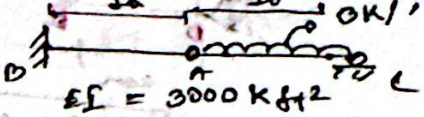
(37)(16) 

(EI) const using virtual work compute deflection @ B & slope @ B
(5B) (2B)

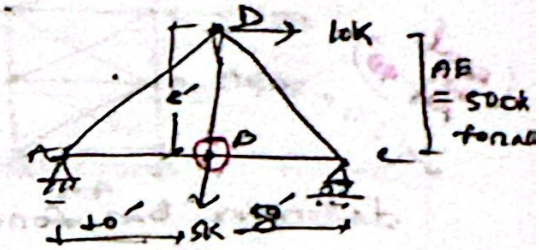
(conti)

(35)(1) 

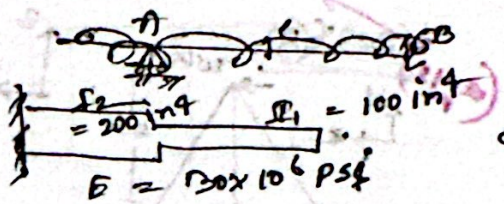
determine deflection under 100lb
$I = 2\times10^3$ in⁴, $E = 30\times10^6$ lb/in²

(39)(24) 

deflection @ A = ?

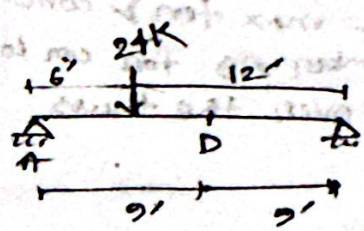
27 2(b) 

determine deflection @ B = ?

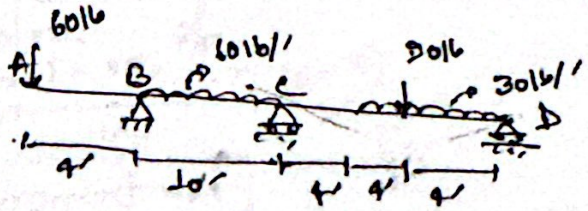
(27)(4) 

determin (max deflection).

(29)(30) 



determine
$\Delta D = ?$ (inch)
$\theta_A = ?$ (rad)
deflection by (unit load)

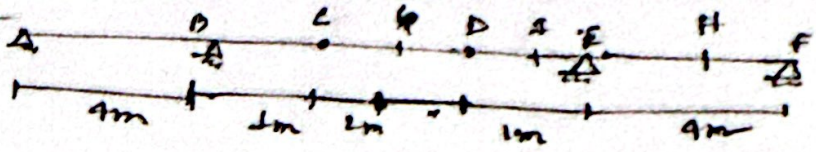
(30)(3) 

determin deflection @ A

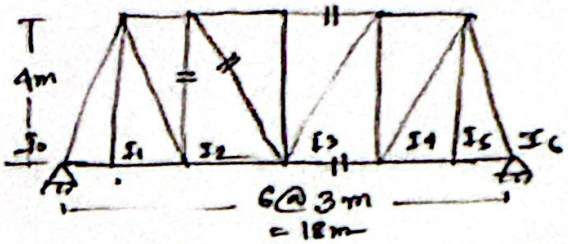
$I = 2\times10^3$ in⁴
$E = 3\times10^6$ lb/in²

IL of Beam/ trusses

(11) | 2(d)

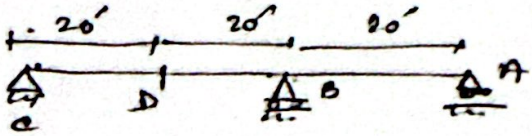


(36) (2b)



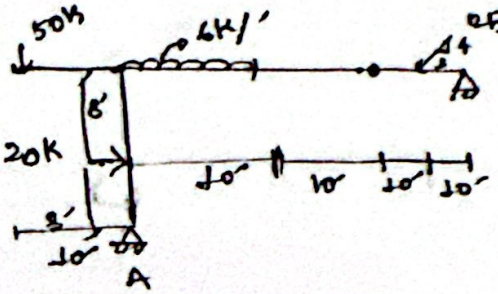
draw IL for trusses

(34) (2c)



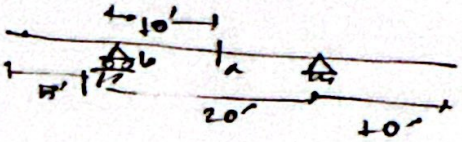
draw IL for shear at D.

(24) (2131)



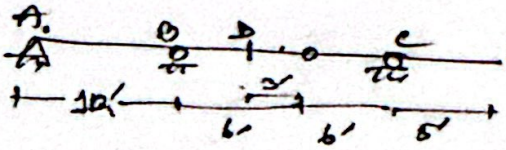
~~Sb for~~ (SFD / BMD)

(25) (2k)



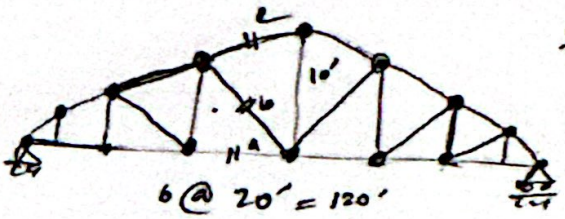
IL for shear @ a
" " moment @ a
" " reaction @ b

(29) 3(a)



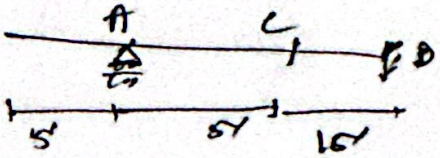
IL for reaction @ A, B, C
" shear & moment @ D

(27) (3b)



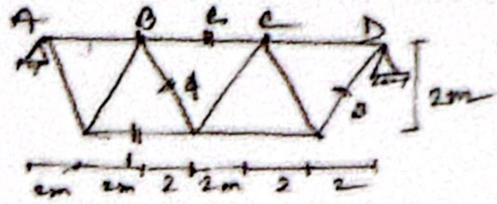
IL @ member a, b, c

(27) (4)



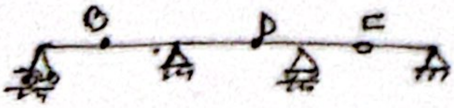
IL for Reaction @ A,
shear @ C
moment @ D & C

(24)(2a)



⇒ Draw IL for 1, 2, 3, 4 member

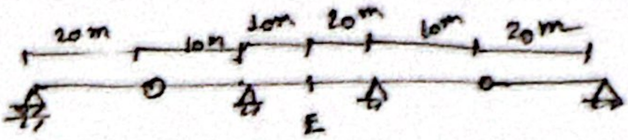
(27)(3a)



IL for reaction @ C

moment & shear @ D

(29)(2a)

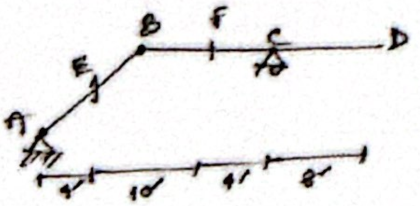


(determine max neg shear @ E

& " " moment "

যখন 2000kg/m distributed load থাকবে।)

(30)(2b)



unit load move from B→D

IL for reaction @ C

shear @ E, F, Left of C

moment @ E, F, C

23th — ID-IL (8-12)pc

math 10 } theory - 20

Transport - (30)

} math 15, theory 15

④ Highway design geo & traffic

1) signs of traffic — (2 —303/ 4

2) Braking distance / SSD & OSD/PSD exp & der ↳(M-9) ↳(M - 11)

(Q-277) ← 3) super elevation কী? extra widen কেন লাগে? ↳(M-7)

4) def: traffic signal, design speed

5) camber → (Q — 269)/types ↳ (M-8) why excess camber should not be provided

(Q- 271) diff camber vs super elevation ←

6) rotary intersection, adv & disadv - (M-19)

7) various types of regulatory speed - (M-17)

(Q-272) ← 8) def: carriage way, shoulder, kerb Footpath, parking, Drive way, ROW Reaction time

9) PIEV time & PCU কী? - (M-22) How to conduct delay & OD study

(Q-285) ← 10) def: vertical curve, gradient, summit curve valley curve, transition curve ↳(M-24)

(graphs) 11) Basic elements of transport planning (Q-288) → 4 movement category to travel pattern (Q-298) → transport landuse cycle (Q-302)

⑤ Train (M-25)

1) Adv of steel sleeper over wooden → function & req of ideal sleeper ↳(M-26)

2) function of ballast - (M - 27) screening of " → req of ideal ballast - (M-28)

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transport

2) Transport highway / highway → (M) - 1

Theory

- 1) Railway, highway, airway diff, adv → Rail - political, social
- 3) types of roadway bd (2) (M)
- 4) diff types of roads / access & movement graph
- 6) rural / urban pic (10) - ROW - (M) - 12
- 7) factor affect - road alignment (10) / (M) - 10
- 8) hilly & desert
- 9) land width of road (ROW) - M - 13
- why geometric design imp. → (M) - 16
- & elements of geo design (4)
- 10)
- 11) objective of highway planning - (M) 15
- & planning surveys. (5)
- - how traffic characteristics influence highway design
- 12) effects of improper drainage - (M) - 22
- Imp of highway drainage & req. - (M) - 3 (5)
- 13) Causes of traffic accidents (M - 6) accident prevention measure (5)
- 14) Transportation system? elements?
- 15) Role of Transportation in our country
- 16) Diff modes of transport
- 17) Reason of traffic jam in dhaka - (M 78)

1) Pavement design

1) Diff Rigid & flex pave (M) - 21
2) Rig & flex adv/dis adv (pic) (M - 50)
3) Flex pavement components work - (G) 314 ← (M)
4) Rig & flex load dist
5) variation of SI (G) (M - 61)
- suitability Inbd - (M - 52)
- define maintenance of roads (M - 58) & classification - (5)
6) Modulus of subgrade reaction
7) def: DTN, ESAL, Serviceability (M) 316 ←, PSI, structural Number (SN), skid resistance (M - 64), Resilient mod, DHV - (M - 61)
8) factors affecting pavement design - (G) 318; (M - 48) structural design of Rigid - (M - 18)
9) flex pavement design method - (G) - 319, & Rigid — design criteria for pav method
10) seal, tack & prime coat - (G) 323 (M - 39)
11) distress in flex & Rig pavement → (G) 310
12) joints of Rigid - (M - 77) / why provided (G - 335) / joint fillers (G 332) (12)
13) WBM & use (G - 326) (M - 54) (M23)
14) Types of Rigid pavement - (G - 330) - (3)

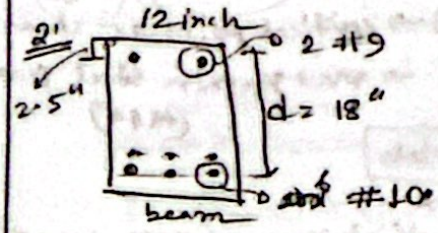
3) transport material

1) Test for road agg, sand, bitumen & test → (G - 291) → (M) - R
2) why LA test is performed - (M) - 9
3) def: flash point, fire point, CBR, loss of heating - (M 11)
4) compare: bitumen & tar - (M) - 19 / type of bitumen (G - 292)
5) Principle & Factors affecting - (M - 5) soil cement stabilization
6. common prop of agg used in road → (M - 45) / (G - 343)
7. grading of bitumen → (M) 69
8. penetration test of bitumen, 80/100 bitumen means what? → (M) 69
9. Soaked & Unsoaked CBR - (M) 68
10. Temp of bitumen surfacing - (M 80)
11. Marshall mix design - (M 76) (G - 353)
12. Screening & FM, process math (G - 326)
13. PMB - polymer modified binder - (M - 9)

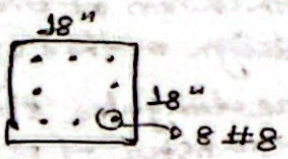
30 - Math
70 - Theory

RCC — (40)

1. What do you mean by under reinforced, balanced & over reinforced beam. Explain neutral axis depth in all 3 cond. of beam — (6)

2. 

If $f_y' = 50$ksi, $f_c' = 5$ksi. What is the design moment capacity of the beam? (14)

3. 

(column)
$f_y = 50$ksi, DL = 225k, LL = 175k. allowable soil pressure, $q_a = 5$ksf. Design square footing & below grade using $f_c' = 4$ksi, $f_y = 50$ksi — (16)

4. What is the advantages of T-beam over rectangular beam? — (4)

5. Draw typical stress strain curves for pre-stressing steels. (3)

6. Where should doubly reinforcement provided? give reason: — (5)

7. Ways of failure of RC structure — 4

8. What is diagonal tension? Derive an expression for spacing of vertical stirrups — (4)

9. Short note: i) flat slab vs two way slab — 4 — (6)
ii) column interaction diagram
iii) punching shear

Theory

→ Lap splice, (tension & comp), column splice – (M25)
→ bar cutoff – (M 21) / bond stress – dev length factor influence → (M17)
→ corner reinf

beam

1) what is T beam, advantages – (M-1) (6)
2) def: flat plate, flat slab, punching shear of slab, 2 way slab, loss of prestress – (M-2)
(M-12) one & 2 way slab diff
3) under/balanced & over reinforced beam, position of NA – (M-3)
4) stress strain curve – prestress – (M-4)
5) why doubly reinf beam prov – (M-5)
6) failure of RC structure – (M-6)
7) what is diagonal tension? stirrup to resist " – (M-7)/(M-31) (how develop)? (& redistribution)
8) develop eq for → spacing of stirrup (M-8) → cracked & uncracked beam
9) column type – short, long, tied, spiral (M-8) (M-50)
10) why high strength conc. used in prestress " " steel (M-9)
11) % of loss in pre & post tension – (M-10)
(M22) → preli & final design of prestress
(M-23) ↳ stages of loading – mor
→ partial prestressing – (M-24)
→ classification of prestress (M-30)
→ RC & PC conc. conc. compression – (M-41)
→ what is prestress conc – M –
(M-11) ← 12) → balanced steel ratio? expression
ρ should be less than ρ_b
(M-16) ← def: modular ratio, stress ratio (r), transformed section (n), tension controlled member
→ strength reduction factor (M20)

prestress

→ purpose of shear reinf
13) → shear of a beam – (M-13)
→ effective flange width (T) (M-14)/(M 60)
(M-35) → critical point of shear failure
→ max & min steel ratio in beam (M47)

Slab

→ thickness of one way slab (M-66)
→ design method of → flat slab/plate (M-19)
→ rectangular slab – load transfer – (M42)

Column

→ diff long & short – (M55)
→ min & max % of steel in col (M13)
→ column interaction diagram (M16)
→ necessity of using unsymmetric reinf in RC column – (M32)
→ slender & long column / type of column (M-44)
→ capacity of tied greater (Cr 160)
→ buckling of column (M49)

Foundation

1) Retaining wall – used / work gravity, cantilever, counterfort ↳ (M-28)
2) diff type of footing → (M-26)

Test

1) Rebar test – (M-66)

Tall & Eq

(M17) ← 13. → criteria for design of tall building
(M-18) → seismic design – methods (2)
(M21) → structural forms of tall building

→ yield pattern on slab – (Cr 158)
Reinf placement → (C) pg 157
→ shrinkage in concrete – (M-37)
→ why w/c ratio is imp in cement workability of " (M-38)

→ ASD / USD diff – (M 51)
→ shear centre, torsion shear (M-56)
→ Lintel & arch – (M61)

Math

1. → spiral column design - support axial load, (DL/LL (ওজন) / f'c / fy ")
→ tied " "
2. Load carrying capacity / beam (column) "

3. → As rear for beam calculate — → load capacity → (62-129)
→ design moment capacity of beam (dubly) / WSD & USD
normal → (M-D)
→ dubly beam design
→ Normal beam design → WSD / USD.
→ nominal moment capacity → Mn
→ (Load UDL + self wt") ⇒ (62-140)
→ T beam

13. stress calculation $f_c = Mc/I$

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Env - (30) { 15 - theory, 15 math | 20 - math, 10 - theory }

Math

(1) Septic tank / leach pit (35)

(2) BOD math (37) / dilution factors / prone (2 - 519) / math (2 - 514)

(3) Sand filter math | trickling filter math (37) BOD removal

(4) Settling tank math (41)

(5) ~~water supply math~~

(6) → Sewage discharge math (35) → Sewage landfill math

→ Lagoon math (41) (40) → ~~bleach~~ bleach rev math (38) (35)

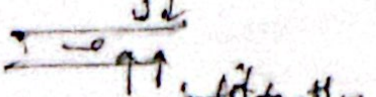
(7) population & fire rev (37)

(8) Salt math | Hardness, alkalinity – (02 - 504) - (40)

(Lime/soda rev) → mor

(9) water supply math

(Rdf) pipe – ~~...~~ – infiltration – (pdf 1.2)



max = 3 × gpcd + infil

min = 0.33 × " + "

Theory   calorific value   ignitability

treatment / filter

1) As removal / co precipitation
Fe " — (M5)
Cl — " / desalination

methods of water purification 6 (2517) → effect of alkalinity in alum co-agulation (M-6)

→ BOD & COD কী? — (M7)

→ principle of bio treatment / (ETP) STP (sewage treatment) (aerobic & anaerobic oxidation diff) → (M8)

→ what is filtration of water — (M-16) & theories of filtration

→ trickling filter — (pdf em✓)

Sewage / Sedimentation / pond

1) principle of sediment tanks — (M-1) (SOR, T, Vs)

2) working principle of Activated sludge (M2) & effluent treatment pit — error

3) what is coagulant & coagulation — (M3)

5) Properties need to make resource from waste (M-9)

→ circular section in sewage use — why. (M-10)

→ sludge digestion affecting factors (M-15)

→ transmission route of water related disease (M-14)

(M12) → water distribution design করতে factors

M-13 → pipe material

Supply / water distribution

1) SDG 6.1 & 6.2 of water supply → upr

2) water quality parameters & acceptance level, test — (62 497)

3) elements of water supply system (M9)

4) quality of water in physical, chemical & bio view — (M-11)

:

w { 20 math
  10 theory

Water → (30) { 20 - theory
  10 math | 24 theory
  6 math

Math

(1) channel design → regime.
→ concrete lined channel
→ surface drainage ∇ — (41st) / 37th
  circular ○ - (36th)

(2) field irrigation → command area - discharge, - 40th / 38th
  time of irrigation 37th
  → HP of pump — (41st)
  → Duty / delta relation

(3) guide bank

(4) ~~population & water reservation~~.

(4) Aquifer / tubewell — (L- 540)

(5) flood prediction —

(6) Rainfall / hydrograph ✓

✓ FIR / NIR ..., dw rev, ... factor, T of irrigation — 40th / 38th
  freq of irrigation (L-584)

— Duty / delta math, HP of pump (41) / (35)

— time of irrigation $t_e = 2.3 \times \frac{y}{f} \times \log\left(\frac{Q}{Q - fA}\right)$ — (L-579)

— gross command area (SWDO) (L-593)

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Blaney criddle $cu = \frac{KP}{40}(1.8t + 32)$
Hargreaves class A pan
Penman

theory

1) irrigation system কি & [illegible] (Recent + old) (cu)
2) flood & control "
3) river & training | meandering | design of canal
regime, SAR

→ types of irrigation — 7 / surface-sub surface / perennial, flood / direct, storage
→ furrow, sprinkler — diff & use in Bd / not used in Bd
→ water logging & cause | control | drainage imp
→ impurities that makes water unfit for irrigation
→ SAR, effect of salt

A) Flood related

Q-19 1) flood কি? causes, measures
Q-20 2) design flood কি? estimate process
Q-22 3) cut off কি? (or artificially introduced)
Q-30 4) human cause of flood in Bd
5) short note —

C) irrigation (Q-32)

1) diff methods to estimate cu of water
2) short note — (Q-34)
Delta,
Duty
(Q-1) SAR
(Q-2) Leaching

B) canal / River training

9) regime [illegible] silt theory (Q-5)

(Q-21) 1) what is meandering of river, cause, " parameter
(Q-23, 24) 2) river training কি? objective? methods
(Q-25) 3) guide bank কি? design procedure
Q-28 4) spur কি? diff types
Q-27 5) spur & guide bank [illegible]
Q-29 6) objective of bank protection / bank failure cause
(Q-3) 7) why irrigation channel designed as regime channel?
(Q-[illegible]) 8) canal [illegible] কি? factors responsible material [illegible]

D) soil water

1) how yield of well is determined (Q-33)
2) diff form of soil water (Q-4)

E) prove

1) $\Delta = 8.64 B / D$ (Q-12)
2) Field capacity, $dw = (FC - PWP) \frac{\gamma_d}{\gamma_w} d_s$

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