Transportation.

BOOK-2 দাম 340TK ও ওটা। (নবাবগঞ্জ).

1/ Why joints are provided in rigid pavement? What do you mean by slip from paving. [Khanna- P449]

2/ What are the factors affecting structural design of rigid pavement? Why do we need to blend the agregates. (Khanna-335) (Book-4, P-44).

3/ Plate bearing test math (page-4, ques).

4/ What is right of way? State factors governing the land width of highway (Khanna-83)

5/ What do you mean by highway alli allignment? Discuss the factors controlling the allignment of highway. (Khanna-51)

6/ State the objectives of highway planning. Explain briefly the planning survey for a highway project. (Khann-21, Khanna-27)

7/ Define the term traffic volume. Explain the different methods for carrying out traffic volume studies. (Khanna-168)

8/ What are the common requisite properties of aggragates in highway construction! (Book-4, Part 1, Page-64)

9/ Compare betn bitumen and tar as a binding material of pt flexible pavement. (Book-2, 352)

10/ Write short notes on application of seal coats, prime coats and tack coats in the construction of flexible pavement. (Book-2, 355) (Book-4, Page-61). & (Book 4, Page-60)

11/ Bitumen mix design math (Page-14)

12/ Mention the introduction requirement of one way traffic operation.

13/ State with examples of the underlying reasons of improving roadway capacity and safety with the introduction of one way traffic operation system?

14] What are the design criteria of for rigid pavement design in PCA method? (Book-2, Page - 374).

15] Draw and explain the variation of serviceability index (SI) with time. (Book-2, P-311)

16] What are the advantage and drawbacks of cement concrete road? (rigid pavement). → Book-2, page-375.

17] Rigid and flexible pavement? → save page opera mini: advantage and disadvantage of rigid pavement.
Which type is better with respect to Bangladesh soil and weather. (Book-2, page 375)

18] Describe the criteria for highway design. (Khanna-335)

19] Define ~~maintainance~~ maintenance of roads. Briefly ~~discuss~~ describe what are the different types of ~~maintain~~ maintenance categories. what are the main shortfalls in the maintenance planning and implementation practices in BD. (Khanna-488) → সমস্যা।

20] What are the main classification of the countries Road network system? Which organization is responsible for their construction and ~~maintain~~ maintenance. Why drainage is important for a road.

21] Calculate the rate of super elevation where curve radius is 170m, $g = 9.8 m/sec^2$. design speed is 100 Km/hr with a side friction factor of 0.09.

22] Describe the criteria for design of highway.

~~23~~] Classify the roads and highways according to BD classification system.

Railway:

i) What is meant by gauge of rail? what are the gauges used in Bangladesh railway. would you advocate one uniform gauge throughout the country? why? (Book-2,)

II) Explain with neat sketch the various devices used in railways to divert trains from one track to another.

III) Discuss briefly the causes and remedies of creep of rails. (Rangwalls: 187, 190).

IV) What is coning of rails. Why coning of wheels is mainly done? (Rangwalls 96).

V) Write the requirements of an ideal sleeper. Write the advantage of steel sleeper over wooden sleeper. (34)

VI) Draw the cross section of ballast in railway. Write the function of ballast. (Rangwalls: 138, 141).

VII) What is meant by the term point and crossing? How the detailed inspection of point and crossing is carried out! (Rangwalls-256)

VIII) why transition curves are provided in Railway tracks? (Rangwalls-198) Enumerate the essential requirements of an ideal transition curve.

IX) Calculate the maximum speed to be provided on a 2 BG transitional curve. The maximum sanctioned speed is 96 kmph. [cant deficiency = 75mm]

*Sleepers: Rangwalls-119,

*maintenance (Rangwalls. 155-156).

*curvature of track (Rangwalls: 195)

*Signalling (Rangwalls-296,

উত্তর:

a. Apron, Taxiway, Runway, Hanger, Area traffic control (ATC), Flash point, Fire point, Loss on heating, Modulus of subgrade reaction,

~~24~~

24] Why are super elevation and extra widening provided at the curved portion of a roadway? Explain.

25] Write down the functions of base, subbase and surface course in flexible pavement.

26] Why is Los Angeles abrasion test performed? Write down the laboratory procedure briefly.

~~25~~ 27] ~~Write down the advantages of s~~ How is orientation of runway made by applying wind rose method? Explain.

Environmental Engineering

working principle of activated sludge process.
1) ITN - 224, 225
2) BOD removal explanation (ITN-261)

1/ Define consumptive use of water. What are the factors affecting consumptive use of water?

2/ Explain the mechanism of filtration. (Aziz-223).

3/ What are the difficulties of in Rapid sand filter? How can you over come those? (Aziz - 239)

4/ What is meant by free available chlorine and combined available chlorine? Explain their mechanism with proper reactions. How these destroy bacteria and virus of polluted water?
(mechanism Br just reading (ITN 220).

→ Aziz - 211, Feroz - 347.

5/ Explain the process of coagulation - sedimentation. How does it differ from plane sedimentation. (Aziz - 211, Feroz - 347).

6/ Draw a typical chlorination curve and explain the reaction zone. Explain break point chlorination. (Aziz: 249, 251-253, Feroz: 363-364). (Book 2, Page: 206, 207).

7/ calculate the dimension of a rectangular settling tank to treat 12m³ of water per hour when the overflow rate is 0.75m/hr and the detention time is 2 hours.

8/ Explain the principle of Biological (Feroz-209) waste treatment process. Outline the difference betn aerobic oxidization and anaerobic digestion process of waste treatment. (Feroz-209)

* How to find well discharge (Feroz - 420, 421)

6

9| Describe the working principle of Activated sludge ... for sewage treatment.
(ITN - 224, 225)

10| Briefly describe the composition of human body waste.

(Book-2, 15th Oct)
11| Define per capita consumption of water. What are the factors affecting per capita consumption of water.

12| State and explain BOD removal kinetics.

Masud Sir sheet.
13| Define potable and palatable water. Which can be used for drinking purpose? What are the basic assumption requirements of drinking water?
(Arzig (page-168))

14| Bleaching Powder এর math টা,

15| Explain the biological treatment process of sludge sewage.
(Feroz - 223).

16| Calculate the BOD removal efficiency for the single stage high rate trickling filter. BOD loading is 750 g/m³/d and recirculation ratio is 0.60.

17| Design a low rate trickling filter to treat 6 of sewage of BOD of 210 mg/l. The final effluent should be 30 mg/l and organic loading rate is 320 g/m³/day.
(Arzig এর টা)

Engineering

working principle of activated sludge process
1) TN - 221, 225

7

solid waste:

34 i) Describe the functional elements of solid waste management.

ii) What are the methods of ~~salinity~~ sanitary land filling disposal of solid waste? Describe.

iii) Define the sanitary landfill method of final disposal of solid wastes. What are the important aspects that need to be considered in the design and operation of sanitary landfills?

34 iv) State the effect of solid waste mismanagement. Define the functional elements of waste management.

18| What is meant by Initial Environment Examination) Its use in different projects.

19| Write down the sanitary significance of the following impurities:
Arsenic, Fluride, Lead. ~~Azizo~~ Aziz and Feroz (178-182) Aziz - 180.

20| State systemetically the process of design of branched as well as looped network of distribution systems. (Feroz - 398).

21| Design a standard filter to treat 8.0 ML/d sewage of BOD5 of 210 mg/l. The final effluent should be 30mg/l 30 mg/l and organic loading rate is 320 g/m3/day. Assume reasonable data if necessary.

টীকা:

Break even point, critical settling velocity, Acquifer,

22) Name some of the factors influence water consumption. State the ways in which these factors influence water consumption.
(Aziz - L-9)

22) Design a rectangular sedimentation tank to treat 2.4 million litres of raw water per day. The overflow rate is 0.5 m/hr and the detention time is 3 hours.
(Feroz - 367 এর ছবি).

(নং) 23) Disinfection? various method of disinfection.

24) Distinguish bet^n,
i) Primary and secondary clarifier ii) Tapped aeration and stepped aeration iii) BOD loading and hydraulic loading.

~~iv~~ 25) Classify the main types of water distribution networks and write their relative advantages and disadvantages

26) Explain with example ~~of~~ a fixed growth and suspended growth treatment system.

27) Environmental significance of BOD and COD. ওজোর math.

28) Define environmental impact assessment. Why baseline environment is to be evaluated for EIA.

math:

Detention time and Surface overflow rate (Job Khata 23, 24), Bleaching Powder (P Job Khata - 25).

math: (Book - 2, P - 216); 215, Sewarage (Arjiz sewarage - 101).

1] Arjiz 2] Book - 2 3] Feroz (Solid waste), Sewer, waste water treatment)
4] Asif Sir's sheet 5] math 6] PDF (Aireation). 7] Masud sir sheet. (3B1)

1| Meandering of rivers? causes? different meander parameters with neat sketch. (Garg - P-198).

2| Objectives and requirements of bank protection? mention the causes of bank failure.

3| "Regim of a river"? compare briefly silth theory of Kennedy and Lacey?

Irrigation method details (Book-2 + 8 179).

4| Differentiate both furrow irrigation with sprinkler irrigation. which is preferred in Bangladesh and why? এবং method গুলোর পার্থক্য।

5| Design a regon channal: $Q = 50$ cumec, Silt factore 1.0. Use Lacey's theory. Assume other missing data.

6| Name the important type of river training method and indicate the purpose for which each type is adopted. + Protection works

7| Guide (Bank bund) bank details → typical plan, section, চিত্র, math সহ।

8| Discuss the advantages of and ill effects of embankment as a measure for flood management.

9| what is spur? Explain the different types of spur based on their alignment with neat sketches.

10| Design channel: $Q = 350$ cumec, slope 1in 5000, side slop 1.5 : 1, (mannings) $n = 0.014$, $v = 2$ m/sec.

Factors affecting consumptive use (Garg - 35, 329).

* [illegible] (Garg - 22, 54, 35,

11] Field capacity এর সূত্রটির প্রমাণ, $d = \frac{F_c V_d}{V_w}$

12] Necessity and importance of irrigation in Bangladesh.

13] Discuss various types of surface irrigation and their suitability in Bangladesh, specify the geographical area.

14] Write down the various type of impurities which make the water unfit for irrigation. (Garg - 17).

15] What is meant by saline and alkaline soils? what precaution would be you adopt to prevent salinity of irrigation land & water logging (bleaching)

16] How the yield of a well is determined?

17] Suitability of sprinkler irrigation in BD.

18] Why irrigation ca channel is designed as regime channel? Justify your answer. (garg - 111).

19] 15 cumecs of water is delevered to a 34 hectare field for 4 hours. Soil proving after the irrigation indicates that 0.3 meter of water has been stored in the rool zone depth. Compute the water application efficiency.

20] Flood management? Describe the different engineering

measures to protect flood prone areas.

21] Discuss on the various methods of estimating the design flood of a catchment.

22] Distinguish betn Groyne and Guide Bank.

* Flood details (Book-2, Page-173-)

4 Unit

* Irrigation structure (Book-2, Page: 94-97).
* Canal Irrigation system (Book 2, Page: 151-156)
* Irrigation (Book-2, Page 179-180).
* Guide Ba River training (Book-2, Page: 160-165)

* छोड़ा:

Flood management[34], Flood proofing[34], controlled flooding[34], Design flood, optimum utilization of irrigation water, Net irrigation requirement, Importance of duty, Root zone[34] depth, Wilting co-eff and field capacity, Duty and Delta, Cut offs, Launching Apron.

* Objectives of river training – (Garg - P-500).

1। Mention the assumptions made in the portal method (BOOK-2, 19) of structural analysis for frame subjected to lateral loads.

2। Establish the criteria for developing absolute max^m bending moment in a girder for a series of moving loads on it, moment distribution method, influence line of truss (P-8) (hand), consistent deformation (P-10), slope deflection (P-11),

3। Difference bet^n cable and arch from structural point of view. State the expansion the basic assumption required for ~~the~~ analysis of cable.

৪। IL এর ব্যবহার (Book-2, P-15).

৫। চিত্র সহকারে চার প্রকার truss এর নমুনা দেখাও। Truss structure সমূহের stress নির্ণয় করতে কি কি assumption করতে হয়। ~~Portal~~

6। Explain different methods ~~of~~ for approximate analysis of building frame subjected to lateral loads.

7। How does the effect of earthquake load differ from wind load when imposed to structure?

* Bridge এর কিছু ques (Nilson - 11th edition থেকে).

Math:

3D truss (Page-1), Portal method (Page-1), Influence Line of beam (P-5), Find the deflection of beam (P-5), IL for Inverted truss (28th Bes), Brace truss (28th Bes), IL of beams (28th), Virtual work method (P-3 28th), IL for Beam and max^m (determinate truss) neg shear and moment (29th), Δ and θ by unit load method.

i) moment distribution method ii) Slope deflection iii) Force method.
IV) Portal (V) Gravity (VI) IL (VII) SFD BMD

RCC + Pre-stress.

1] Define shear of a beam. Mention the location of critical shear for failure for simply supported and fixed supported beam from support centreline. Draw neat sketch.

2] Balanced steel ratio? In well designed RC beam why actual steel ratio is well below the balanced steel ratio?

3] What is corner reins? why and where are they used? State ACI/BNBC specification for such reins.

4] Mention the different types of spread footing generally used in RC construction. Also state the suitability of each type.

5] why does ACI/BNBC code recommend a relatively small value of shear as design shear that occcur at a distance d from the support face?

6] what are diagonal tension cracks in beam? How does the formation of diagonal cracks cause the redistribution of internall stress in RC beam?.

7] Explain strength interaction diagram of RC column. Also state the necessity of unsymmetrical reins in RC column.

8] As, per ACI code, in case of -Ve moment co. efficient for design of slab are same for DL and LL but in case of +Ve moment co-efficient for Live load is heisher than that of DL. Explain why? (Wilson - 11th edn — 935)

9] Describe briefly what are ment by stress design and strength design in respect of concrete structure.

10] why shrinkage stresses are developed in concrete and how they are taken care of?? → corner reins.

11] why water cement ratio is so important? Workability of concrete? (Book-2; P-336).

12] Describe the failure pattern of an under designed and over designed beam.

13] slender column ?

14] what is T beam ? advantage of T beam over rectangular beam.

15] short column, long column, tied column, spiral column ?

16] what

19, 20 → Slab, 21, 22 → Beam, Tbeam, shear, 23, 24 → column, 26, 27 - loss, 28-29 → Prestress

30 → Theory

Prestress

1) Write down the classification of pre stress concrete structure. Explain any three.

2) Compare prestressed concrete with RCC. respect to serviceability, safety and economy. (Book-2, P-291).

3) Flat plate slab design (Page-6).

4) Interior slab pannel design (Book-2, Page-260).

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3) Why comperatively high strength of concrete is required for p concrete?

4) Write down the percentages of fo losses in pretension and post tension material.

Math:

1) Design a RC circular spiral column from the given data:
DL = 180k, LL = 80k, f'c = 3ksi, fy = 60ksi. (Job kchuta - 15)

2) Spread footing design (Page-2).

3) Shear reint design (Page-6).

4) Beam er steel calculation (Page- 28th).

5) Shear design (R (28th).

6) Square column design (28th).

7) Allowable column load calculation (28th).

8) Interior slab pannel design (28th),

9) Rectangular RCC column design (WSD) (29th).

10) Interior slab design (29th).

11) T beam design (29th).

12) Beam design (WSD)

13) Axial load capacity calculation (34th).

14) Tie bar design (Job kchuta - 8).

(Column, Beam, shear, Slab, prestress)

1] Active and Passive Earth pressure. (Arora - P-478)

2] Draw a neat diagram showing the variation of different co-efficient of earth pressure.

3] What are the principle objective of soil exploration? Write down the most common types of in situ tests. (In situ test → Like vane shear test, SPT, CPT) → BM Das (P-558).

4] What are the different types of raft foundation? Explain the procedure for designing raft foundation. (Book-2 - P-45, BM Arora - 651)

5] Explain the various types of pile foundation.

6] Basic objectives and specification of soil compaction test. (Book-2, Page-435)

7] What is meant by OCR? Differentiate betⁿ OC clay and NC clay. How will you find the pre consolidation of clay? (Book-2, Page-405)

8] where and why geotextiles are used.

9] " " " raft " "

10] " " " sheet piling " "

11] Draw and discuss different types of footing.

12] Differentiate the following:

Shey Seepage and permeability, Effective stress and total stress, sand pile and sand drain.

13] When and why pile foundation is more suitable than that of shallow foundation.

14] State different methods for determining the co. eff of permeability of soil. Explain factors affecting the permeability of soil.

15] Difference betⁿ primary and secondary consolidation of soil.

16] What is SPT? & How it is carried out in field? Explain the

relationship of SPT value with bearing capacity of soil.

17] Define shear strength of soil. Explain the shear characteristics of cohesive and cohesion less soil.

18] when and why pile foundation is considered for construction of Bridge? Discuss the merit and demerits of pole foundation:
i) Cast in situ pile ii) Pre cast concrete pile. full bunding.

19] What are the causes of soil sample disturbance in soil test? Mention the effects of soil sample disturbance on the engineering properties of soil.

20] What are the main types of soil? How they differ from each other in respect of their characteristics and behaviour? What.

math

1। consolidation math (P-12).

2। Pile math (P-12).

3। bulk density, dry density, void ratio math (P-13).

4। consolidation math (P-5).

5। Square footing design (28th).

6। sq " " " (water table) (29th).

great depth এসব থাকবে নীচে

23

প্রশ্ন:

(Arunna-78) (Book-2, P-450) (Book-2, 429) (Job Lecture 67)

Plasticity index, Sand drain, Negative skin friction, Liquefaction of soil, (Flow index (Book-2, 382), toughness index (Book-2, 382), Liquidity index (Book-2, 382)), ~~Plast~~ Density index, Over consolidated clay, Pore water pressure, Secondary settlement, caisson/well foundation, Co-eff of permeability (Book-2, 407), Degree of saturation (Arunna-15), (Coffer dam + use), SPT, Sensitivity of soil (Book-2, 382), Geotextile and its use (Arunna P-385), Cantilever retaining wall, Compaction of soil, Mat foundation, Quick sand condition (Arunna, 516) (Book-2, P-440)

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* Mat Foundation (Book-2, 44).

math: BM DAS (282, 298, 299).

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