Mohammad Shehab Bhuiyan
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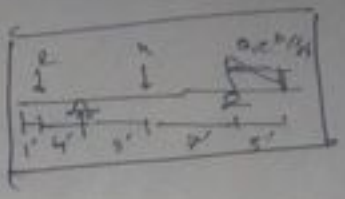
Bangladesh Power Development Board

Venue: BUET

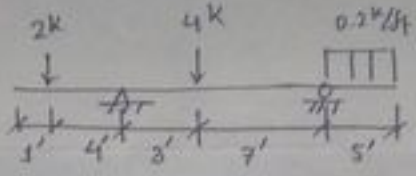
Date: 26-02-2021



Non-departmental = 40×1 = 40 marks

Departmental = 6×10 = 60 mark

1) Draw SFD & BMD.



(10)

2) Calculate included angle ∠B. (05)

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AB ⟶ 60°30'

BC ⟶ 118°

CD ⟶ 48°30'

3) (05)

(a) Slump test height measurement 30 cm.

(b) Initial setting time of ordinary portland cement 30 mins.

(c) Length of standard brick 9.5".

(d) Arsenic limit according to ~~Bang~~ Bangladesh standard 0.05 mg/L.

(e) 100% passes through # 100 no sieve. Calculate FM = 0 ?

4) (05)

(a) Meandering radio of alluvial river ____.

(b) Salinity of water is measured by SAR value.

(c)

(d) Unit of noise is expressed as dB.

(e) BOD value of a sample is less than COD value of that sample.

5) Calculate FM value. (05)

	Retained	% Retained	Cumm % Retained
# 16	20		
# 30	20		
# 40	20		
# 50	20		
# 100	20		

6) A rectangular tank of length 5m, width 3m and heigh 2.5m. Calculate pressure force at the bottom of the tank ? (10)

7) 10 cm dia pipe with a flow rate average velocity 10 m/s. Calculate discharge in l/s. Also calculate the velocity of the another end of the pipe with gradual dia of 20 cm/s. (10)

8) Initia and dinnal DO of a sample is 7 mg/L & 3 mg/L. K (base) vale is 0.2 day^{-1}. Calculate BOD_5 value? (10)

Bangladesh Power Development Board (BPDB) – 2021

Post: Assistant Engineer (Civil)

Date: 26-02-2021; Friday; Time: 10:00 AM – 11:00 AM

Exam Taker: BUET

Time: 1 hour **Full Marks: 100**

Non-Technical Part – 40×1 = 40

1. নিচের কোনটি তদ্ভব শব্দ? – **হাত**
2. বসন্তে ফুল ফোটে – বসন্তে কোন কারক? – **অধিকরণ কারক**
3. সঠিক বানান কোনটি? – **পুণ্য**
4. ষ-ত্ব বিধান বহির্ভূত কোনটি? – **ভাষা**
5. শাশ্বত বঙ্গ কার লেখা? – **কাজী আব্দুল ওদুদ**
6. মণীষা-এর বিপরীত শব্দ কোনটি? – **নির্বোধ**

7. সাধু ও চলিত ভাষার পার্থক্য কোন পদে? – **সর্বনাম ও ক্রিয়া পদে**
8. যিনি বরণের যোগ্য? – **বরেণ্য**
9. বাংলা স্বরবর্ণে দীর্ঘস্বর বর্ণ কয়টি? – **৬টি** (দীর্ঘস্বর ধ্বনি ৭টি)
10. অধিকাংশের মতে বাংলা ভাষার উৎপত্তি কোন শতকে? – **অষ্টম শতকে**
11. If the two side of a rectangle is 8 and 6 cm, then what will be the diagonal? **10 cm.**
12. Difference of two odd numbers square is divisible by – **sum of them and subtraction of them.**
13. Find the nth term of the sequence: 5, 2, -1, -4, -7..... **Answer: 8-3n**
14. y = 4x is the equation of a line which passes through –

    (a) y-axis (b) positive x-axis **(c) origin** (d) negative x-axis
15. When three dice are thrown simultaneously, thus number of event can be – $\mathbf{6^3 = 216}$
16. The age of father 10 years ago was thrice the age of his son. Ten years hence, father's age will be twice that of his son. The ratio of their present age is:

    (a) 5 : 2 **(b) 7 : 3** (c) 9 : 2 (d) 13 : 4
17. 1 + 2 + 3 +.....+49 =? **Answer: 1225**
18. If x and y are negative, then which of the following statements is/are always true? – **x/y is positive**
19. If a2x + 2 = 1; where a is positive real number other than 1. Then x =?

    (a) -2 **(b) -1** (c) 0 (d) 1
20. What least value should be given to X so that the number 6342X1 is divisible by 3?

    (a) 0 (b) 1 **(c) 2** (d) 3
21. Length of Padma Bridge – **6.15 km**
22. Birth place of Birsreshtho Hamidur Rahman – **Jinaidah**
23. Bangabandhu Safari Park situated at – **Sreepur, Gazipur**
24. Who was the first commander of sector four? – **Chitto Ranjon Datta**

25. Which country related with 'water' –

26. How many ODI match won by Bangladesh so far – **131** [146, updated 09 February,2023]

27. EPZ started its operation from which year? – **1983**

28. What is the GDP growth in 2019-2020 fiscal year? – **5.24%** [7.10% in 2021-2022]

29. Who is the father of www? – **Tim Burners Lee**

30. Water density measuring device – **Hydrometer**

31. Teacher judges students **by** their results.

32. Correct spelling – **miscellaneous**

33. Correct sentence – **He started the work**

34. 'High handed' means – **oppressive**

35. He can't **put up with** the noise in the class.

36. Salt has been used for centuries as a method of preserving food. Here 'preserving' means – **conserving.**

37. Antonym of 'overstrug' – **Calm**

38. At last the beast in him got _____ upper hand.

39. _____, I wouldn't have one.

40. A Beruni ----- fonds **of** -----.

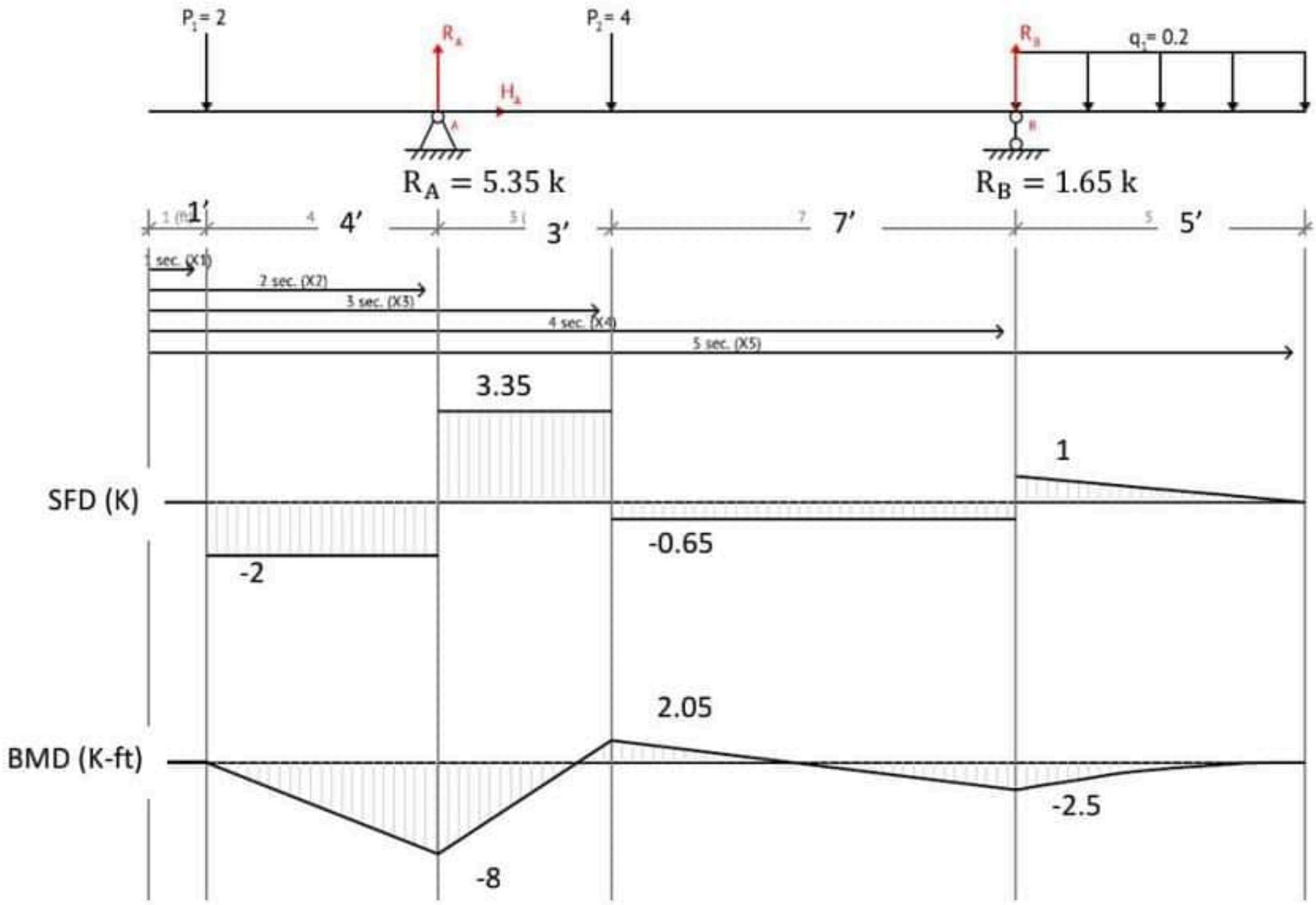
(বিশেষ দ্রষ্টব্যঃ অসম্পূর্ণ প্রশ্ন পাওয়া গেলে কমেন্টে জানানোর অনুরোধ করছি)

Facebook Group Link: www.facebook.com/groups/civil.job

Technical Part – 6×10 = 60

1. Draw SFD and BMD:

Sol^{n}:



2. (a) Calculate included angle ∠B:

AB	**60°30′**
BC	**118°**
CD	**48°30′**

Sol^{n}:

$$\therefore \angle B = \text{BB of AB} - \text{FB of BC} = (180° + 60°) - 118° = 122°30'$$

(b) Fill in the blanks:

(i) Length of standard brick is **9.5 inch**.

(ii) Initial setting time of ordinary Portland cement is **45** minutes.

(iii) Slump test height measurement is **30** cm. (12 inch)

(iv) 100% passes through #100 sieve. The FM value = **0**.

(v) Arsenic limit according to Bangladesh standard is **0.05** mg/L.

3. (a) Fill in the gaps with appropriate word:

(i) Meandering ratio of alluvial river is _____.

(ii) Salinity of water is measured by **electrical conductivity (EC)** value.

(iii) Unit of noise is expressed as **dB**.
(iv) BOD value of a sample is **less** than COD value of that sample.

(v) Tensile strength of 40 grade steel is **40 ksi**.

(b) The sieve analysis of a sand sample is given below. Calculate FM value of the sand sample:

Sieve No.	Weight Retained (gm)
#16	20
#30	20
#40	20
#50	20
#100	20

Sol^n:

Sieve No.	Weight Retained (gm)	Cumulative Wt. Retained (gm)	% Cumulative Wt. Retained
#16	20	20	20
#30	20	40	40
#40	20	-	-
#50	20	80	80
#100	20	100	100
	Total = 100 gm		Total = 240

$$\therefore \text{Fineness Modulus, } FM = \frac{240}{100} = 2.40$$

4. A rectangular tank of 5 m length, 3 m width and 2.5 m height. Calculate pressure force at the bottom of the tank.

Sol^n:

Here,

$A = 5 \times 3 = 15\ m^2$
$\bar{x} = 2.5\ m$
$w = 9.81\ kN/m^3$

$\therefore$ Pressure force at the bottom, $P = wA\bar{x} = 9.81 \times 15 \times 2.5 = 367.875\ kN$

5. A circular pipe with 10 cm diameter having flow with an average velocity of $10\ ms^{-1}$. Calculate the discharge in lps. Also calculate the velocity of another end of the pipe with gradual diameter of $20\ cms^{-1}$.

Sol^n:

Here,

$d_1 = 10\ cm = 0.1\ m$
$v_1 = 10\ ms^{-1}$
$d_2 = 20\ cm = 0.2\ m$

$$\therefore \text{Discharge, } Q_1 = A_1 v_1 = \frac{\pi {d_1}^2}{4} \times v_1 = \frac{\pi \times (0.1)^2}{4} \times 10 = 0.0785\ m^3/s = 78.5\ lps$$

From continuity eqn, $A_1 v_1 = A_2 v_2$

$$\therefore v_2 = \frac{A_1 v_1}{A_2} = \frac{0.0785}{\frac{\pi \times (0.2)^2}{4}} = 2.5 \text{ ms}^{-1}$$

6. Initial and final dissolved oxygen (DO) of a sample for 3 days is 7 mg/L and 3 mg/L respectively. The value of k 0.2 day^{-1}. Calculate BOD_5 value.

Sol^n:

Assume, Dilution Factor, DF = 1

$\therefore BOD_3 = (DO_i - DO_f) \times DF = (7 - 3) \times 1 = 4 \text{ mg/L}$

We know,

$BOD_3 = L_o (1 - e^{-kt})$

$\Rightarrow 4 = L_o (1 - e^{-0.2 \times 3})$

$\therefore L_o = 8.87 \text{ mg/L}$

Now, $BOD_5 = 8.87 \times (1 - e^{-0.2 \times 5}) = 5.60 \text{ mg/L}$