B.E. (Civil Engineering) Seventh Semester (C.B.S.) Winter 2022

Advanced Concrete Structures

P. Pages : 2 **SPM/KW/22/2274**

Time : Four Hours Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.
12. Use of IS-456, 2000 and IS 3370 is permissible.

1. Design a circular water tank with flexible base for storage capacity 4 lakh liters of water. The height of the tank is 4.0 m and free board of 0.25 mtr. Use M_{20} grade of concrete and Fe – 415 grade of steel. Design top dome, ring beam and circular warp. Draw reinforcement details. **14**

OR

2. Design the rectangular water tank 5m x 4m with the depth of storage 3.5 mtr. The tank is resting on the ground whose wall are fixed at base and free at the top. Design the wall of water tank by using IS code method or by approximate method. Use M25 grade of concrete and Fe415 steel. **14**

3. Design an isolated footing for a column, an ultimate load of 900 kN and ultimate moment of 100 kN.m about an major axis bisecting the depth of column. The size of column is 300 x 600mm. SBC of soil is to be taken as $200\,kN/m^2$. Use M_{20} grade of concrete and Fe_{415} steel. **13**

OR

4. Design biaxially loaded RCC column subjected to ultimate load of 500 kN, ultimate moment of 75 kN.m about major axis and 60 kN.m about minor axis, the unsupported length of column is 3.5 mtr. Assume size of column as 350 x 450mm. Use M_{20} grade of concrete & Fe_{415} steel. Consider effective length equal to unsupported length. **13**

5. A continuous beam of two span 8m each carries a factored dead load of 15 kN/m and factored live load of 25 kN/m. Draw Bending moment diagram envelopes offer 30% redistribution. **13**

OR

6. a) Explain redistributes of moment and state its advantage. **6**

b) Describe about moment curvature relationship, with respect to reinforced concrete section. Also sketch the diagram. **7**

7. Design the stem of a cantilever retaining wall which is required to support a bank of earth 4 m above the GL. The hard strata for foundation is available at 1.3 m below GL. $SBC = 170\, kN/m^3$, and unit weight of soil $= 16\, kN/m^3$, angle of shearing resistance is 25º, Use M_{20} grade concrete and Fe_{415}. Curtail main reinforcement and design distribution reinforcement also. **13**

OR

8. A counter of retaining wall to retain 6.5 m embankment above ground level. The foundation is to be taken 1.5 m below ground level where the bearing capacity of soil may be taken as $200\, kN/m^2$. The back fill is horizontal and soil have density of $18\, kN/m^3$ with angle of internal friction is 25º, $\mu = 0.4$, design stem of counterfort retaining wall UM_{25} concrete & Fe_{415} steel. **13**

9. Explain in details the various design steps for R.C. portal frame. **13**

OR

10. Design the dog legged stair case (waist type slab for an office building 2.5 m x 4 m to suit the following data. **13**

1) Height between floors = 3.6 mtr.
2) Provide 100 mm bearing at each end
3) $LL = 3.5\, kN/m^2$
4) $FF = 1 kN/m^2$; one end of flight is resting on the plinth beam and other on the landing beam at the end of flight. Use M_{20} grade of concrete and Fe_{415} grad. Steel.

11. Design a combined fooling for two column $C_1 \& C_2$ of size $800\, mm \times 800\, mm$ and $600\, mm \times 600\, mm$ carrying a load of 1400 kN and 1000 kN respectively. **14**
The width of footing is restricted to 2.1 m. The column are spaced at 4 m c/c
$SBC = 160\, kN/m^2$. Use M_{20} grade of concrete and Fe_{415} steel.

OR

12. Design a combined footing for two column A & B carrying a load of 800 kN and 1000 kN at 4.8 mtr apart column. A is $350\, mm \times 350\, mm$ and B is $450\, mm \times 450\, mm$. The length of the footing restricted to 6m. Assume SBC of soil $170\, kN/m^2$. Use M_{20} grade of concrete and Fe_{500} steel. **14**

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B.E. (Civil Engineering) Seventh Semester (C.B.S.) Winter 2022

Estimating & Costing

P. Pages : 4 **SPM/KW/22/2275**

Time : Four Hours Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
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5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. a) Explain with suitable examples, the various methods of calculating approximate estimates. **6**

b) The following table is an extract from the longitudinal section of a road earth work survey. Calculate the volume of earth work **7**

a) Formation width of a road 14.0 m

b) Sides slopes

i) In banking – 2:1

ii) In cutting – 1.5:1

CHAINASE	0	30	60	90	120	150	180
R. L of Ground. m	99.70	99.80	100.30	100.50	100.80	100.9	100.60
R. L of Formation m	100.50	lin	300 (+)		lin	150 (-)	

OR

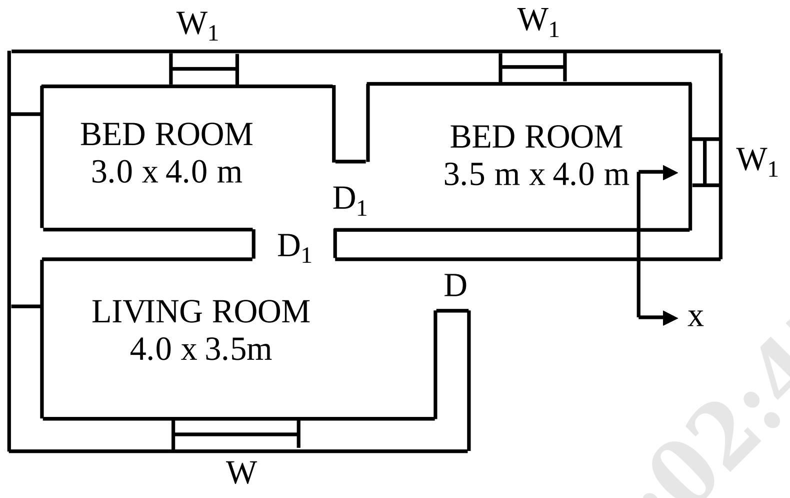
2. a) Prepare a preliminary estimate of a multistoried office building having carpet area of 2200 sq. m 35% of total built up area will be taken up by corridors, verandah, lavatory and staircase etc. 10% of total built up area is occupied by walls. Assume plinth area rate as Rs 3000.00 per square metre. Consider 8% of the building cost for water supply and sanitation fiting. 10% for electrical fiting. 8% for other services and 2% for architectural treatment. **7**

b) What are various methods of calculating Detailed Estimate? Explain centre line method compares to other methods **6**

3. a) The accompanying drawing shows a building plan and a typical wall section. Prepare centre line plan and estimate the quantities of the following items of work in standard proforma . (fig. I) **8**

i) Earth work in Excavation in foundation.

ii) Brick work in foundation upto plinth level



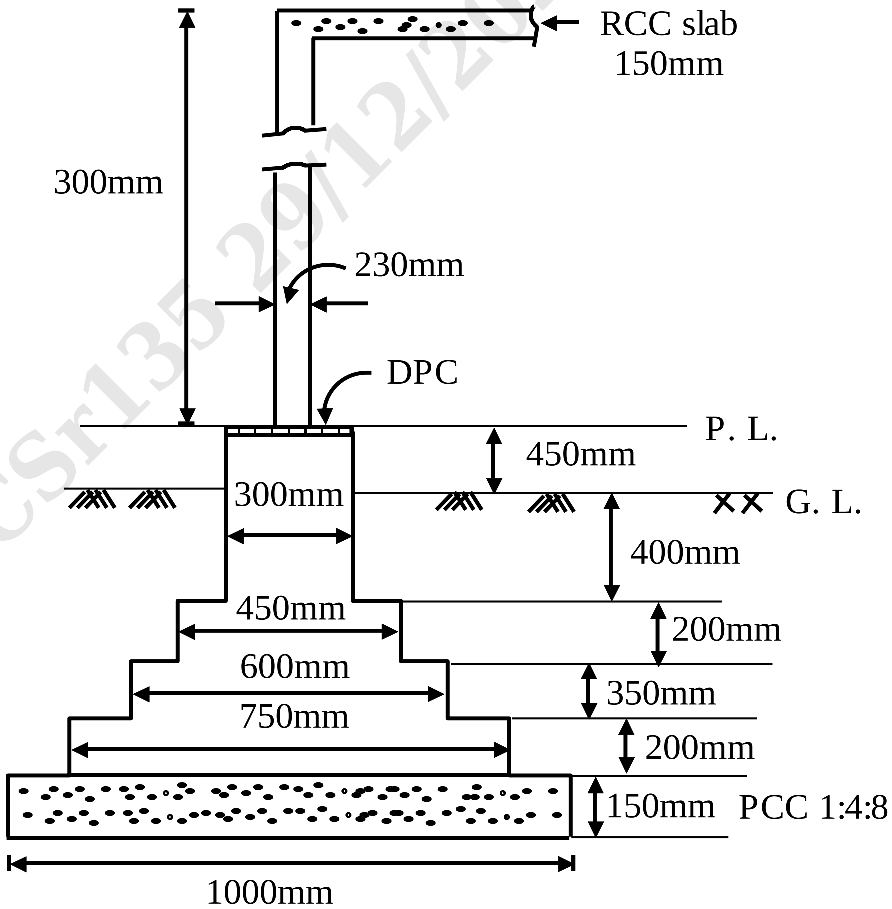
*PLAN (Fig. I)

D = 1.2x2.10m

D_1 = 1.0x2.10 m

W = 1.2x1.2m

W_1 = 0.90x1.2m



SEC - XX (Fig. - I)

b) Workout the quantity of steel reinforcement in bar bending schedule for a RCC beam of size 230mm x 300mm x 4000mm. It has 2 Nos of 12mmϕ straight and 2 Nos 12mmϕ bent up at bottom and 2 Nos, 10mmϕ at top M.S Reinforcement with 6mmϕ stirrups @ 200mm c/c. Assume cover as 25mm throughout (top, bottom, side) **6**

OR

4. a) Figure I shows plan & section **8**

Calculate:-

i) IInd class brick masonry in cm1:5 in super structure.

ii) 12mm thick internal plaster in cm1:4 for ceiling and walls.

b) A RCC slab, overall size 330mm x 6800mm x 130mm is provided with 16mmϕ as a main steel reinforcement bent up alternately and placed @ 140mm c/c. Alternate bars are bent up at 540mm from outer edge of slab. Distribution steel bars are of 6mmϕ @ 180mm c/c. Assume cover as 20mm throughout (All steel bars of Mild steel) calculate the quantities of steel reinforcement. **6**

5. a) Define term “Contract”. What are the various types of contract? Explain advantages and disadvantages of any one. **7**

b) Explain the term “Administrative approval” and “technical sanction”. **6**

OR

6. a) i) Explain different types of tenders. **7**

ii) Enlist an information to be included in tender notice.

b) i) Explain the contract documents **6**

ii) Explain the reasons for rejection of the lowest tender.

7. a) Define specification. What are the types of specification. Explain in brief. **6**

b) Write a detailed specification for the following **any two.** **7**

i) Earthwork in excavation in soft soil.

ii) Brick masonry in superstructure, IInd class in cm 1:6.

iii) Laying PCC 1:4:8 mix in foundation.

OR

8. a) Explain the points to be kept in mind while drafting specifications. **7**

b) Explain “Direct & Indirect charges” **6**

9. a) Define Rate analysis. Explain factors affecting it. **6**

b) Workout rate analysis for the following items **any two.** **8**

i) Brick masonry in cm 1:6 in superstructure with brick size 23cm x 11cm x 7cm.

ii) Plain cement contract 1:4:8 mix.

iii) 15mm thick cement plaster in cm 1:2.

OR

10. a) Explain in detail the task work of labourer and factor affecting it. **6**

b) Calculate the rate per unit item of the following **any two.** **8**

i) RCC work (1:1½ : 3) in column with 5% steel reinforcement including shuttering in column.

ii) 15 cm thick cement concrete flooring (1:3:6).

iii) Stone masonry in super structure in cm 1:3.

11. a) What is valuation? Explain in brief the various purposes of valuation. **6**

b) A person has purchased an old building at the cost of Rs 90 lakhs on the basis that the cost of land is Rs 50 lakhs and the cost of building structure is Rs 40 lakhs. Considering the future life of a building as 20 years. Calculate the amount of sinking fund at 4% interest. When the scrap value is 10% of the building structure. **7**

OR

12. a) Enlist the various types of value. Explain any two. **6**

b) A leasehold property is to produce a net annual income of Rs 12,000 for the next 20 years. The owner expects a return of 8% on his capital and also sets apart a sinking fund to accumulate at 6% annually to replace the capital. Determine the capitalized value of the property. **7**

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B.E. (Civil Engineering) Seventh Semester (C.B.S.) Winter 2022

Elective-I : Advanced Traffic Engineering

P. Pages : 3 **SPM/KW/22/2277**

Time : Three Hours Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
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6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. a) Explain in detail the various vehicular characteristics. How do they affect in design? **6**

b) A passenger car weighing 2t is required to accelerate at the rate of $3\text{m}/\text{sec}^2$ from a speed of 15kmph on a gradient of +1.00% on a W.B.M. road surface. Assuming that the frontal area of the car is 2.1m^2, Calculate the engine H. P. needed for running speed of 40kmph. Take coefficient of rolling resistance (f) as 0.025, coefficient of air resistance (c_a) as 0.39 **7**

OR

2. a) The following data represent volume in PCU of average of six runs in a moving observer study. Analyse the data for **6**

i) Directional flow

ii) Directional running speed.

iii) Directional journey speed

Data: length of section = 1.42km

Run Direction	Travel Time (sec.)	Vehicles met from opposite direction	No. of vehicles		Stopped time (sec.)
			Overtaking	Overtaken	
E	172	94	7	5	9.6
W	151	120	8	10	11.2

b) How planning is carried out from traffic volume studies for providing transportation facilities. **7**

3. On a motor way, the numbers of vehicles arriving from one direction in successive 10 seconds interval was counted and recorded in table. **13**

Vehicles arriving in 10 sec. interval	Frequency
0	12
1	25
2	32
3	20
4	9
5	4
6	2
7 or more	0

Find out the mean rate of arrival and with the help of Poissonian distribution, compare the observed frequency with theoretical frequency.

OR

4. a) The spot speeds at a particular location are normally distributed with a mean of 51.8 kmph and a standard deviation of 8.2 kmph. What is the probability that, **7**

i) The speed exceeds 65 kmph

ii) The speed lies between 40 kmph and 70 kmph

iii) What is the 85^{th} percentile speed?

b) Discuss the methods available for conducting of spot speed studies. **6**

5. Design a rotary intersection for the following data of two highway situated in Urban area. The highway intersects at right angles and has a carriage way width of 15m. Make suitable assumption. **13**

Approach	Left Turning in PCU	Straight Turning in PCU	Right Turning in PCU
N	404	530	408
E	420	630	360
S	430	430	490
W	520	320	400

OR

6. a) Draw neat sketches of various types of grade separated intersection showing on it all the traffic movements. **7**

b) Define intersection. What are the basic principles followed in the design of road intersection. **6**

7. a) A toll booth con hand 110 veh./hr. If the vehicle arrivals during the peak flow of 90 veh./approach/hr are random & source time exponential calculate. **8**

a) Average queue length

b) Expected number of vehicle in the system

c) Average time spent by the vehicle in the system

d) Probability that there are no vehicle in the system

e) Average time spent by the vehicle in the queue.

b) Enlist various types of traffic signs & write in general principles of traffic signing. **6**

OR

8. a) What is signal co-ordination? Explain in brief various types of co-ordination systems used? **6**

b) The average normal flow of traffic on cross roads A and B during design period are 370 and 230 PCU/hour respectively and the saturation flow values on these roads are estimated as 1200 and 1000 PCU/hour. The all red time required for pedestrian crossing is 12 sec. Design the two phase traffic signal by Webster's method. **8**

9. a) Explain collision diagram with neat sketch. **6**

b) It is observed that on an average a vehicle driver drives 5000 km during the course of year. The probability of having an accident is 100 per 180 million vehicle kilometers. What is the probability of a driver having at least two accidents during his driving career extending to 25 yrs. **8**

OR

10. a) Write a short note on 3E's of traffic management. **7**

b) It has been observed that on an average 1 in 100 drivers in a bus company are involved in an accident every year. It there are 500 drivers in the company. What is the probability that there are exactly 4 drivers who are involved in accident during a year. **7**

11. a) Estimate the total parking demand in the commercial area having following floor area composition: **7**

i) Offices – $5500m^2$
ii) Shops – $3460m^2$
iii) Restaurants – 350 seats
iv) Cinema Hall – 800 seats
v) Two star Hotel – 58 rooms.

b) What is man transportation? Explain the merits and demerits of it indicating various modes of transportation used in metropolises of India. **6**

OR

12. a) State various problems due to Urban traffic and explain how there can be trackled in metro cities. **6**

b) What are the various types of parking facilities designed for traffic needs? Compare on street parking with off street parking. **7**

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B.E. (Civil Engineering) Seventh Semester (C.B.S.) Winter 2022

Elective-I : Air Pollution and Solid Waste Management

P. Pages : 2 **SPM/KW/22/2278**

Time : Three Hours Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
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5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and chemical equations should be given whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.
12. Use of non programmable calculator is permitted.

1. a) Define air pollution? Explain various sources of air pollution. **7**

b) What are the major air pollutants? Discuss the effects of air pollutants on human beings any two. **6**

OR

2. a) Explain Green House Effect and discuss how it can be controlled. **7**

b) Discuss in brief standards of air pollution. **6**

3. a) Explain meteorological factors affecting air pollution. **7**

b) Define wind rose. Describe its significance in air pollution studies. **7**

OR

4. a) Write a note on High Volume Sampler. **7**

b) Explain different types of plume behaviour with neat sketches. **7**

5. a) State various types of equipments used to control particulate matter and explain any one in detail. **7**

b) Write a note Automobile exhaust (diesel and petrol). **6**

OR

6. a) Discuss noise pollution and its ill effects and its control. **7**

b) Explain electrostatic precipitator with the help of neat sketch. **6**

7.	a)	What are the various sources of generation of solid waste? Explain.	**7**
	b)	Discuss the composition of solid waste in Indian cities.	**6**

OR

8.	a)	Discuss the physical and chemical characteristics of solid waste in India.	**7**
	b)	Explain the functional elements of solid waste management.	**6**
9.	a)	Explain in detail the house of house collection of solid waste.	**7**
	b)	Discuss in detail the Transfer station and its types.	**6**

OR

10.	a)	Describe various types of transportation vehicles used for collection and transportation of solid waste.	**7**
	b)	Discuss the concept of optimization of transport route.	**6**
11.	a)	Explain various methods of sanitary Landfilling.	**7**
	b)	Explain the factors affecting composting of solid waste any four.	**7**

OR

12. Write short notes on **any three**. **14**

i) Site selection of sanitary landfill.
ii) Types of incinerators.
iii) Leachate control from sanitary landfill.
iv) Control of gases from sanitary landfill.

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B.E. (Civil Engineering) Seventh Semester (C.B.S.) Winter 2022

Construction Management & Law

P. Pages : 2
Time : Three Hours

SPM/KW/22/2283
Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
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3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain various types of public-private partnership. **7**

b) Write the importance of project feasibility study. **6**

OR

2. a) Give importance of site layout planning. **6**

b) Write a note on price escalation provision in construction field. **7**

3. a) What do you mean by slack of an event? Define positive, zero and negative slack. **7**

b) Define float of an activity. Explain super-critical, critical and sub-critical activity. **7**

OR

4. The estimated time of completion of each activity for a construction project is given in table. Develop CPM network, compute activity times, total float, free float and Independent float for each activity. Locate the critical path for the network. **14**

The network logic is as follows: -

i) At the start of the project, activities A & B are the initial activities & are done concurrently.
ii) Activity D follows A and C follows B,
iii) Activity E, F & I follows C and can be done concurrently,
iv) G follows F and precedes H,
v) Activity J & L are parallel activities and can be started only when H & I are completed.
vi) Activity K is immediate successor to D, E and J,
vii) Activities K and L are parallel activities,
viii) The last activity m is immediate successor to K & L and project ends.

Activity	A	B	C	D	E	F	G	H	I	J	K	L	M
Duration	36	4	2	2	10	15	4	9	9	9	20	8	20

5.	a)	Write down the merits and demerits of line organization.	**7**
	b)	Explain the importance and need of manpower planning.	**7**

OR

6.	a)	Describe level of stock aspect of material management.	**7**
	b)	Explain the working of plain roller and sheep footed rollers.	**7**
7.	a)	Explain principles of total quality management.	**6**
	b)	Write down the salient points of safety management.	**7**

OR

8.	a)	Write a note on management information system in brief.	**7**
	b)	Discuss the safety measures to be followed during demolition and dismantling work.	**6**
9.	a)	Write down the functions of authority as per provisions of Maharashtra Regional town Planning Act.	**6**
	b)	Write down the objective of Maharashtra Housing Regulatory and development Act 2012.	**7**

OR

10.	a)	Write a note on: - i) Indian Highway Act 1956 ii) Maharashtra Gunthewari Development Act 2001.	**6**
	b)	Write a note on Maharashtra Irrigation Act 1976.	**7**
11.	a)	Define environment and give information about legislations enacted as per environment protection Act 1986.	**7**
	b)	Give information about amendments made in 1988 in Indian forest Act 1927.	**6**

OR

12.	a)	Write down the provisions of section 24 of water pollution Act 1974.	**7**
	b)	Write a note on enactment of Air (Prevention and control of pollution) Act 1981.	**6**

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B.E. (Civil Engineering) Seventh Semester (C.B.S.) Winter 2022

Transportation Engineering-II

P. Pages : 2 **SPM/KW/22/2284**

Time : Three Hours Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
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7. Solve Question 11 OR Questions No. 12.
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9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) What are the different gauges used in India? Discuss the factor affecting selection of gauges. **6**

b) What do you understand by "Permanent Way"? Discuss the requirements of ideal permanent way. **7**

OR

2. a) Calculate the maximum permissible train load that can be pulled by locomotive having four pair of driving wheels carrying the axial load of 20 tonn each. The train has running speed of 80 kmph on B.G. track? **7**

b) Discuss the necessity and effect of coning of wheels. **6**

3. a) What are the objectives of providing ballast in the permanent way. Also discuss the various types of ballast. **6**

b) Using sleeper density n+6.2 calculate the sleeper density require constructing the B.G. track 1280m. **7**

OR

4. Write short notes on **any three.** **13**

a) LWR

b) Length of transition curve

c) Tongue Rail

d) Sleeper density

5. a) Draw the neat sketches of various types of crossings in use on Indian railways. Explain in brief. **8**

b) Discuss the marshalling yard & its types. **6**

OR

6. a) What is the necessity of Track Maintenance? Discuss. **6**

b) Write notes on **any two.** **8**
   i) check rails.
   ii) Home signal
   iii) Starter Signal

7. a) Define the terms **6**
   i) Cross-Wind component
   ii) Wind coverage

b) The length of runway under standard conditions is 1400m. The Airport is to be provided at an elevation of 300m above mean sea level. The airport reference temperature is 26ºC. If effective gradient is 0.3%. Determine the corrected length of runway? **7**

OR

8. a) Explain the procedure of runway orientation? **7**

b) Discuss the characteristics of an aircraft that influences the planning & design of airport facilities. **6**

9. a) What are the different parking systems for an aircraft? Discuss any one in detail. **6**

b) Write short notes on: **7**
   i) Approach lighting
   ii) Runway markings.

OR

10. a) What are the characteristics of an ideal airport layout. **6**

b) What is the function of air traffic control. What different enroute aids and landing aids are used in modern air-transport? **7**

11. a) What are the objects of Tunnel Ventilation. Discuss the requirements of a ventilating system. **7**

b) What are the objects providing the tunnel with permanent lining. Discuss in brief various material used for lining of tunnel. **7**

OR

12. Write short notes on: **14**
   a) Drainage of tunnel
   b) Lighting in Tunnel
   c) Tunnel survey.

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