

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2080 Ashwin

Exam.	Regular		
Level	M.Sc.	Full Marks	60
Programme	MSTrE	Pass Marks	30
Year / Part	I / I	Time	3 hrs.

Subject: - Road Construction Material and Technology

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. How the road aggregates are produced for the different pavement layers? List out the tests to be conducted on road aggregates. Describe how do you find construction value of bitumen in laboratory. [2+4+4]

2. Define road construction technology. What construction activities had to be executed for the successful completion of road project? Describe in detail the construction method for Scarification and Reprofilng works. [2+4+4]

3. Why and when combining of aggregates are needed? Calculate the proportion of three aggregates by mathematical method to meet the specification for Asphalt Concrete as given in table below. [2+8]

Sieve mm	Percentage Passing the given sieve size				
	19 mm Aggregate A	13.2 mm Aggregate B	Stone Dust C	Specification	
				Limits	Mid-point
19.00	100.00	100.00	100.00	100	100
13.2	18.05	100.00	100.00	80 – 100	90
9.50	0.00	76.00	100.00	70 – 88	79
4.75	0.00	2.00	98.80	53 – 71	62
2.36	0.00	0.50	88.50	42 – 58	50
1.18	0.00	0.00	65.50	34 – 48	41
0.60	0.00	0.00	50.00	26 – 38	32
0.30	0.00	0.00	36.50	18 – 28	23
0.15	0.00	0.00	22.50	12 – 20	16
0.075	0.00	0.00	9.20	4 – 10	7

4. How do you plan earthworks in road construction? List out the different types of pavements usually constructed. Describe the construction steps in sequence for laying of the Asphalt Concrete. [2+4+4]

5. Explain in detail how do you prepare the specimens for Mix Design of Asphalt Concrete. Determine the binder content after extraction test on the sample of AC mix collected from the laying area. Following data are available:- Weight of the AC sample = 1150 gm, Weight of filter before test = 15 gm, Weight of filter paper after test = 15.8 gm, Weight of aggregate in the bowl after test = 1085 gm. The deduction correction factor for binder content is 6%. [5+5]

6. Explain briefly general procedure for quality control of construction materials. Explain the construction procedure of surface dressing for the quality of works. Prepare a test frequency table for gabion retaining structure. [2+3+5]

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Bhadra

Exam.	Regular		
Level	M.Sc.	Full Marks	60
Programme	MSTrE	Pass Marks	30
Year / Part	1 / 1	Time	3 hrs.

Subject: - Road Construction Material and Technology (CE 805-C02)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt *All* questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

- Broadly classify the different materials used in road construction. Define road aggregates. Describe test procedure to determine the crushing value of aggregate. [4+2+4]
- What tests are conducted on bitumen for the pavement construction works? Describe the test procedure to determine the accelerated polishing value of aggregate and to determine the ductility of bitumen. [2+4+4]
- In what case combining of aggregates are required? Calculate the proportion of three aggregates by mathematical method to meet the specification as given in table below. [2+8]

BS sieve size (mm)	Percentage passing the given sieve size				
	Fine Aggregate A	Intermediate Aggregate B	Coarse Aggregate C	Specification	
				Limits	Mid point
25.0	100	100	100	100	100.0
12.5	100	100	92.0	90 – 100	95.0
4.75	100	100	50.0	60 – 80	70.0
1.18	100	65.0	33.0	35 – 55	45.0
0.300	100	32.0	20.0	15 – 35	25.0
0.150	75.0	18.0	9.0	10 – 20	15.0
0.075	40.0	5.0	3.0	3 – 8	5.50

- Define premix and describe Marshall Design Procedure for Asphalt Concrete. [2+8]
- How many types of Surface Dressing do you know? What are the main functions of Surface Dressing? Describe in detail the construction methodology of Surface Dressing Pavement. [1+2+7]
- What should be done to achieve the quality of construction works? Explain the working procedure of crushed stone base construction for the quality of works. What test formats are required for the material tests to be conducted for gravel wearing course? Give a test format sample of any material test. [3+3+4]

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INSTITUTE OF ENGINEERING
Examination Control Division
2075 Bhadra

Exam.	Regular / Back		
Level	M.Sc.	Full Marks	60
Programme	Transportation Engineering	Pass Marks	30
Year / Part	I / I	Time	3 hrs.

Subject: - Road Construction Material and Technology (CE805-C02)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Which construction materials do you choose for the construction of embankment fillings. sub - base course, base course and flexible wearing course? Describe the desirable properties of the soil for sub - grade and aggregates for the pavement works, Describe test procedure to determine the flakiness index of aggregate. (3+3+4)
2. List out the tests conducted on road for the pavement construction. Describe the test procedure to determine the Los Angeles Abrasion value of aggregate and to determine the softening point of bitumen. (2+4+4)
3. What is Mass Haul diagram and why it is benefit to draw? Describe the construction technology of mechanical soil stabilization. (3+7)
4. Differentiate between the prime coat and tack coat and mention its main functions. Describe the method of construction of Asphalt /concrete. (3+7)
5. Explain the different types of road equipments and plants used in road construction. Elaborate its uses for different activities of the road construction components. (5+5)
6. What contents should be there in Quality Assurance Plan? Explain the construction procedure of stone masonry for the quality of works. Draw a test frequency table for earthwork in filling for embankment. (2+3+5)

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Chaitra

Exam	Regular		
Level	M.Sc.	Full marks	60
Program	Transportation Engineering	Pass marks	30
Year/Part	I/I	Time	3 hrs.

Subject: - Road Construction Material and Technology

- ✓ Candidates are required to give their answer in their own words as far as practicable
- ✓ Attempt **any Six** questions.
- ✓ The figures in the margin indicate **Full Marks.**
- ✓ Assume suitable data if necessary.

1. Explain the materials used in different layers of the road pavement. Describe the desirable properties of the soil for sub-grade and aggregates for the pavement works. Describe test procedure to determine the aggregate crushing value. [3+3+4]
2. What tests are conducted on road binders for its suitability to use on road construction? Describe the test procedure to determine the Los Angeles Abrasion value of road aggregates and to determine the Penetration value of bitumen. [2+4+4]
3. Explain briefly the main factors that depends the construction technology. What are the different activities to be performed in road construction? Describe the construction technology of bituminous carpet. [3+3+4]
4. Explain briefly the main factors that depends the construction technology. List out the different tools, equipment and plants used in road construction. Elaborate its uses for different activities of the road construction components. [3+7]
5. Define premix and describe in detail the requirement of ingredients for the production of Asphalt Concrete. [2+8]
6. What tests are conducted on Asphalt Concrete? Describe the test procedure to determine the Marshall Stability and Marshall Flow value of the asphalt concrete. [3+7]
7. Write short notes on (Any two) [5*2]
 - i) Sub-surface drains and horizontal drains.
 - ii) Construction of surface dressing.
 - iii) Classification of road construction materials.

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam	Regular		
Level	M.Sc.	Full marks	60
Program	Transportation	Pass marks	30
Year/Part	I/I	Time	3 hrs.

Subject: - Road Construction Material and Technology

- ✓ Candidates are required to give their answer in their own words as far as practicable
- ✓ Attempt **any Six** questions.
- ✓ The figures in the margin indicate **Full Marks.**
- ✓ Assume suitable data if necessary.

1. Define asphalt concrete. Differentiate between the hot mix and cold mix. Explain the Marshall design method for asphalt concrete. [2+2+6]
2. What tests are conducted on aggregate for its suitability to use in road construction? Describe the test procedure to determine the Aggregate Crushing Value (ACV) of aggregate and test procedure to determine the Viscosity of bitumen. [2+4+4]
3. Explain briefly the main factors that depends the construction technology. What are the different activities to be performed in road construction? Describe the construction technology of Crushed Stone Base Course. [3+3+4]
4. What do you understand by shrinkage and swelling factor of soils? What equipment and plants do you need for the accomplishment of different activities of road construction? [2+8]
5. List out the different types of road pavements. Differentiate between the flexible and rigid pavements. Describe the method of construction of sub grade layer. [4+2+4]
6. What tests are conducted on Asphalt Concrete? Describe the test procedure to determine the binder content in the asphalt concrete. [3+7]
7. Write short notes on (Any two) [5*2]
 - i) Road construction materials.
 - ii) Definitions and classification of bitumen.
 - iii) Construction of surface dressing.

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam	Regular		
Level	M.Sc.	Full marks	60
Program	Transportation	Pass marks	30
Year/Part	I/I	Time	3 hrs.

Subject: - Road Construction Material and Technology

- ✓ Candidates are required to give their answer in their own words as far as practicable
- ✓ Attempt **any Six** questions.
- ✓ The figures in the margin indicate **Full Marks.**
- ✓ Assume suitable data if necessary.

1. Explain the materials used in different layers of the road pavement. List out the desirable properties of the soil for sub-grade and aggregates for the pavement works. Describe test procedure to determine the Los Angeles abrasion value of road aggregates. [3+3+4]
2. What tests are conducted on road binders for its suitability to use on road construction? Describe the test procedure to determine the aggregate impact value and to determine the loss on heating of bitumen. [2+4+4]
3. How do you plan and manage the earthwork in road construction? Describe the construction technology of surface dressing and grouted macadam. [2+4+4]
4. List out the different types of road pavements. Differentiate between the flexible and rigid pavements. Describe the method of construction of base course layer. [4+2+4]
5. Define premix and describe ingredients requirement for the production of Asphalt Concrete. [2+8]
6. What tests are conducted on Asphalt Concrete Mix? Describe the test procedure to determine the binder content in the asphalt concrete. [3+7]
7. Write short notes on (Any two) [5*2]
 - i) Equipment and plants for road construction.
 - ii) Classification of road binders.
 - iii) Construction of cement concrete pavement.

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam	Regular		
Level	M.Sc.	Full marks	60
Program	Transportation	Pass marks	30
Year/Part	I/I	Time	3 hrs.

Subject: - Road Construction Material and Technology

- ✓ Candidates are required to give their answer in their own words as far as practicable
- ✓ Attempt **any Six** questions.
- ✓ The figures in the margin indicate **Full Marks.**
- ✓ Assume suitable data if necessary.

1. Define asphalt concrete. Differentiate between the hot mix and cold mix. Explain the Marshall design method for asphalt concrete? [2+2+6]
2. What tests are conducted on aggregates for its suitability to use in road construction? Describe the test procedure to determine the Ten Percentage fineness value of aggregate and test procedure to determine the viscosity of bitumen. [2+4+4]
3. Explain briefly the main factors that depends the construction technology. What are the different activities to be performed in road construction? Describe the construction technology of bituminous bound macadam. [3+3+4]
4. What do you understand by shrinkage and swelling factor? What equipment and plants do you need for the accomplishment of different activities of road construction? [2+8]
5. Explain why and at what place do you need the river training works. Describe different activities to be executed for the land slide stabilization works. [3+7]
6. What tests are conducted on Asphalt Concrete? Describe the test procedure to determine the binder content in the asphalt concrete. [3+7]
7. Write short notes on (Any two) [5*2]
 - i) Anchor walls.
 - ii) Sub surface drain and horizontal drain.
 - iii) Construction of surface dressing.

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam	Regular		
Level	M.Sc.	Full marks	60
Program	Transportation	Pass marks	30
Year/Part	I/I	Time	3 hrs.

Subject: - Road Construction Materials and Technology (CE824)

- ✓ Candidates are required to give their answer in their own words as far as practicable
- ✓ Attempt **any Six** questions.
- ✓ The figures in the margin indicate **Full Marks.**
- ✓ Assume suitable data if necessary.

1. Define bituminous premix. Differentiate between the hot mix and cold mix. Explain the Marshall design method for asphalt concrete? [2+2+6]
2. What tests are conducted on bitumen for its suitability to use on road construction? Describe the test procedure to determine the aggregate polishing value and procedure to determine the softening point of bitumen. [2+4+4]
3. Explain briefly the main factors that depends the construction technology. Explain the different types of soil stabilization. Describe the construction technology of mechanical stabilization. [3+3+4]
4. What is mass haul diagram? Draw a mass haul diagram with neat sketch explaining the properties of the diagram. Describe the method of construction of surface dressing. [2+4+4]
5. Explain how the gully formation occurs. Describe different activities to be executed for the gully control works. [2+8]
6. What do you understand by road maintenance? Describe the different types of road maintenance. Explain the maintenance of the bituminous pavements. [2+4+4]
7. Write short notes on (Any two) [5*2]
 - i) Prioritization of the road maintenance.
 - ii) Anchor walls
 - iii) Land slide stabilization.
 - iv) Construction of bituminous bound macadam.

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam	Regular		
Level	M.Sc.	Full marks	60
Program	Transportation Planning	Pass marks	30
Year/Part	I/I	Time	3 hrs.

Subject: - Road Construction Material and Technology

- ✓ Candidates are required to give their answer in their own words as far as practicable
- ✓ Attempt **any Six** questions.
- ✓ The figures in the margin indicate **Full Marks.**
- ✓ Assume suitable data if necessary.

1. Define asphalt concrete. Differentiate between the hot mix and cold mix. What are the ingredients and its requirement of asphalt concrete? [2+2+6]
2. What tests are conducted on road aggregates for its suitability to use on road construction? Describe the test procedure to determine the ten percent fineness of aggregate and to determine the penetration value of bitumen. [2+4+4]
3. Explain briefly the main factors that depends the construction technology. Explain the different types of road equipment and plants used in road construction. Elaborate its uses for different activities of the road construction components. [3+7]
4. Define road construction technology. List out the different types of road construction activities. Describe the method of construction of earthworks. [2+4+4]
5. Explain how the land slide occurs. Describe different activities to be executed for the land slide stabilization. [2+8]
6. Why road maintenance is necessary? Describe the causes of road failures. Explain the maintenance of the road washout with neat sketch. [2+4+4]
7. Write short notes on (Any two) [5*2]
 - i) Prioritization of the road maintenance.
 - ii) Marshal stability design method.
 - iii) River training structures.
 - iv) Construction of Otta seal.

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam	Regular		
Level	M.Sc.	Full marks	60
Program	Transportation Planning	Pass marks	30
Year/Part	I/I	Time	3 hrs.

Subject: - Road Construction Materials & Technology

- ✓ Candidates are required to give their answer in their own words as far as practicable
- ✓ Attempt **any Six** questions.
- ✓ The figures in the margin indicate **Full Marks.**
- ✓ Assume suitable data if necessary.

1. Explain the materials used in different layers of the road pavement. Describe the desirable properties of the soil for sub-grade and aggregates for the pavement works. Describe test procedure to determine the LOS Angeles abrasion value of road aggregates. [3+3+4]
2. What tests are conducted on road binders for its suitability to use on road construction? Describe the test procedure to determine the aggregate crushing value and to determine the softening point of bitumen. [2+4+4]
3. How do you plan and manage the earthwork in road construction? Describe the construction technology of Asphalt Concrete. [2+8]
4. List out the different types of road pavements. Differentiate between the flexible and rigid pavements. Describe the method of construction of bituminous carpet. [4+2+4]
5. Define premix and explain Marshal Method of mix design for asphalt concrete [2+8]
6. Why road maintenance is necessary? Describe about the rigid pavement failure. Explain the maintenance of the rigid pavement. [1+4+5]
7. Write short notes on (Any two) [5*2]
 - i) Pavement evaluation.
 - ii) Causes of failure and maintenance of flexible pavement.
 - iii) Sub-surface drains and horizontal drains.
 - iv) Anchor walls.
