Code No: **R42017** **R10** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

PAVEMENT ANALYSIS DESIGN AND EVALUATION

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1	a)	Compare and contrast between flexible and cement concrete pavements	[8]
	b)	With a neat sketch explain the functions of different layers of a flexible and rigid pavement.	[7]
2	a)	Write a detailed note on i) alligator cracking ii) reflection cracking in flexible pavements.	[8]
	b)	State the reasons for warping cracking in cement concrete pavements. Explain how are they counteracted.	[7]
3	a)	Describe maintenance of WBM roads.	[8]
	b)	Discuss special repairs with reference to cement concrete pavements.	[7]
4	a)	Differentiate between functional and structural evaluation of pavements.	[8]
	b)	Explain Benkelman bean method to evaluate structural condition of a flexible pavement.	[7]
5	a)	Mention different types of overlays and emphasize on bituminous overlays on existing flexible pavements.	[8]
	b)	An existing pavement consists of 25cm rigid pavement with 7.5 cm bituminous overlay. The existing pavement is to be strengthened to be equivalent to a single rigid pavement of 36cm in view of increase in traffic loads. Assume a F factor of 0.9 and C_b of 0.9 for existing pavement.	[7]
6	a)	Explain the consequences of poor drainage system on highways.	[8]
	b)	Enumerate methods of providing good sub surface drainage system. Explain any one method in detail with a neat sketch	[7]
7	a)	Write a note on various pavement deterioration models with suitability	[8]
	b)	Discuss project level and network level management in PMS	[7]
8	a)	Discuss the need for Asset management in Highways	[8]
	b)	What are the factors covered under Asset management of Highways? Explain	[7]

Code No: **R42017** **R10** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

PAVEMENT ANALYSIS DESIGN AND EVALUATION

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1 a) What are the different types of pavements? Highlight the advantages and disadvantages of each one of them including their suitability. [8]
b) Explain construction of Gravel roads. Where are they used? Mention MORTH specifications foe selection of materials [7]

2 a) Describe causes of failures in flexible pavements and indicate the corresponding type of failure [8]
b) Write a detailed note on i) mud pumping and
ii) spalling of joints in cement concrete pavements. [7]

3 a) Write a detailed note on special repairs in flexible pavements. [8]
b) Describe maintenance of cement concrete roads. [7]

4 a) Write a detailed note on evaluation of pavement surface conditions. [8]
b) Explain use of dynamic cone penetrometer on structural evaluation of Pavements. [7]

5 a) What are the different concrete overlays and elaborate the procedure for design of concrete overlays [8]
b) Benkelman beam studies were carried out on 15 selected points on a stretch of a flexible pavement during summer season using a dual wheel load of 4085kg and 5.6kg/sqcm pressure. The deflection values obtained in mm after making the necessary lag correction are given below. If the present traffic consists of 750 commercial vehicles per day, determine the thickness of the bituminous overlay required, if the pavement temperature during the test was 30^0 C and the correction factor for subsequent increase in subgrade moisture content is 1.3. Assume annual growth rate of traffic as 7.5%. Adopt IRC guidelines. 1.42, 1.33, 1,28, 1.30, 1.45, 1.50, 1.65, 1.56, 1.48, 1.42, 1.38, 1.48, 1.50, 1.54, 1.48 [7]

6 a) Discuss basic principles of good drainage in Highway structures [8]
b) Elaborate design principles of subsurface drainage system. [7]

7 a) Discuss the need for Pavement Management system with examples [8]
b) Discuss project level and network level management in PMS [7]

8 a) Discuss the need for Asset management in Highways [8]
b) What do you understand by i) Traffic management and
ii) safety management in Pavement asset management [7]

Code No: **R42017** **R10** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

PAVEMENT ANALYSIS DESIGN AND EVALUATION

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Write in detail about i) porous pavements ii) full depth asphalt pavements. [8]
b) What are the critical stresses and strains important for design of pavements? Discuss [7]

2 a) A flexible pavement laid was investigated and it was found that the subgrade was not compacted properly. Discuss in detail the possible types of failures in such pavements. [8]
b) Elaborate, what do you understand by i) structural cracking ii) frost heaving? [7]

3 a) With an example differentiate between periodic and routine maintenance of Pavements. [8]
b) Write a note on maintenance of bituminous surfaces. [7]

4 a) Describe various pavement structural evaluation techniques and their suitability. [8]
b) Write a note on i) rutting ii) potholes and methods to negotiate them [7]

5 a) Discuss in detail rigid overlay over rigid pavements. [8]
b) An existing pavement consists of 25cm rigid pavement with 7.5 cm bituminous overlay. The existing pavement is to be strengthened to be equivalent to a single rigid pavement of 36cm in view of increase in traffic loads. Assume a F factor of 0.9 and C_b of 0.9 for existing pavement [7]

6 a) Why id highway drainage important and discuss the requirements of a good highway drainage system [8]
b) Write a note on i) control of seepage flow and ii) control of capillary rise as a part of lowering water table in Highway drainage. [7]

7 a) Write a note on various pavement deterioration models with suitability. [8]
b) How does project level management differ from network level management in PMS [7]

8 a) What is the concept of Asset management in Highways? [8]
b) Write a note on Bridge and safety management in Highways. [7]

Code No: **R42017** **R10** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

PAVEMENT ANALYSIS DESIGN AND EVALUATION

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1 a) What are the different types of cement concrete pavements? Discuss criteria for selecting the appropriate. [8]
b) Compare and contrast between flexible and cement concrete pavements. [7]

2 a) What types of failures, in flexible pavements are observed at traffic signals? Discuss [8]
b) Discuss any three types of failures in cement concrete pavements. [7]

3 a) Describe maintenance of Earthen roads. [8]
b) How does routine maintenance and periodic maintenance contribute to life of a pavement? Discuss with an example. [7]

4 a) Write a detailed note on evaluation of pavement surface conditions. [8]
b) Describe various pavement structural evaluation techniques and their suitability. [7]

5 a) Explain suitability of flexible and rigid overlays with emphasis on flexible overlay on rigid pavements [8]
b) Benkelman beam studies were carried out on 15 selected points on a stretch of a flexible pavement during summer season using a dual wheel load of 4085kg and 5.6kg/sqcm pressure. The deflection values obtained in mm after making the necessary lag correction are given below. If the present traffic consists of 750 commercial vehicles per day, determine the thickness of the bituminous overlay required, if the pavement temperature during the test was 36^0 C and the correction factor for subsequent increase in subgrade moisture content is 1.3. Assume annual growth rate of traffic as 7.5%. Adopt IRC guidelines. 1.40, 1.32, 1,25, 1.35, 1.48, 1.60, 1.65, 1.55, 1.45, 1.40, 1.36, 1.46, 1.50, 1.52, 1.45 [7]

6 a) With a neat sketch explain various types of cross drainage works in Highways. [8]
b) Enumerate methods of providing good sub surface drainage system. Explain any one method in detail with a neat sketch. [7]

7 a) Write a note on various pavement deterioration models with suitability. [8]
b) How does project level management differ from network level management in PMS [7]

8 a) Discuss the need for Asset management in Highways. [8]
b) Enumerate the factors covered under Asset management of Highways and explain any two. [7]