

Government College of Engineering, Amravati
(An Autonomous Institute of Government of Maharashtra)

Fourth Semester B. Tech. (Civil Engineering)

Summer – 2016

Course Code: CEU402

Course Name: Transportation Engineering

Time: 2 hr. 30min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
- 2) Diagrams/sketches should be given wherever necessary.
- 3) Figures to the right indicate full marks.

1. Solve any two of following

- (a) Briefly explain the engineering surveys needed 06 for locating a new highway.
- (b) What is meant by Gradient? State the objects 06 of providing it. On what factors does it depend? State the values of gradient as per recommendations of I.R.C. for different classes of terrain.
- (c) Explain briefly the different types of 06 bituminous materials used in the construction of black top roads. Also state the grades of road Tar and the situations for which they are suited.
2. (a) Explain the component parts of the pavement 08 structure of a road and their functions.

Cont.

- (b) List the different types of bituminous roads and state the examples of each type. **04**
3. (a) Explain briefly construction procedure of premix carpet. **06**
- (b) Explain with the help of neat sketch the transverse joints provided in concrete pavements. **06**
4. (a) Describe the basic hydraulic and ground data needed for the design of a bridge. **06**
- (b) Explain the following component parts of a bridge with the help of neat sketches and state their suitability-
i) Trestle pier ii) Abutment with return wing wall iii) Rocker bearing **06**
5. Solve any two of following **06**
- (a) Explain with the help of neat sketches the following types of bridges-
i) R.C.C. hollow girder bridge
ii) Steel truss bridge **06**
- (b) Explain the terms 'normal scour depth'. How is it determined at the proposed bridge site? **06**
- (c) Explain with the help of neat sketches the drift method of tunnel construction. **06**

ndation- Open / spread, Raft, Pile, Well Cofferdam
- Solid, dumbbell shape, Hammer head, Trestle, frame, cylindrical
ments - Without - Buried, T, straight
, with - straight, Return, spalled

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1. (a) Describe the various stages in a new highway 03 project.

~~4~~ (b) State the various objectives of preliminary survey 03 for highway alignment. Enumerate the details to be collected and the various steps involved in it.

(c) Draw a neat sketch showing cross section of 03 National highway in cutting showing all important dimensions.

(d) Define Camber. State its necessity. State the 03 values of camber for different regions recommended by IRC.

OR

Explain ruling, minimum and exceptional gradients. Specify the values recommended by IRC for plains and hills.

Contd..

2. (a) A national highway passing through a flat terrain has a horizontal curve of radius equal to the ruling minimum radius. If the design speed is 100 kmph, calculate the absolute minimum sight distance, super elevation and extra widening required. Assume necessary data suitably. 06
- (b) List the various tests required to be conducted on bitumen and state the purpose of each. Also state the minimum values of these properties normally required. 06
- 3 (a) Explain with a neat sketch the design of flexible pavements by CBR method. Also state the advantages and limitations of the method. 06
- (b) Explain in detail the Marshall method of bituminous mix design of materials. 06
OR
What are the different types of bituminous constructions usually adopted? Explain in detail the construction procedure for penetration macadam.
- 4 (a) Explain in brief the typical flexible pavement layers failures. Explain the necessity of design approach and method of strengthening of existing pavements for the case flexible overlay over flexible pavement. 06
OR
State the purpose of providing joints in rigid pavements. Explain with the help neat sketch the construction of contraction and longitudinal joints.
- (b) Explain in brief the classification of bridges based on various criteria. Also state the suitability of 04

each one of them.

- (c) Define following terms: 02
- i) Liner waterway
 - ii) Scour depth
 - iii) Afflux
 - iv) Economic span of bridge
- 5 (a) Draw a neat sketch of a typical bridge showing the various bridge components. Explain the functions of the various bridge components. 06
- (b) Draw neat sketch of a typical tunnel cross section suitable for a two-lane highway tunnel showing important dimensions. 03
- OR**
- Explain the necessity of the following in case of a tunnel.
- i) Lining of tunnels
 - ii) Drainage
 - iii) Ventilation
- (c) List the various methods of tunneling in hard rock. Explain briefly any one of them. 03

Government College of Engineering, Amravati
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VI Semester B. Tech (Civil Engg.)

Summer - 2010

Course Code:CE 604

Course Name : Transportation Engineering - I

Time: 2 Hrs. 30 Min.

Max. Marks: 60

Instructions to Candidate

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary and clearly state the assumptions made.
- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
- 5) Figures to the right indicate full marks.

1. a) Explain in details the role of transportation in National development. Also discuss the factors affecting Highway planning. **6**
- b) Draw a neat sketch of road in embankment. Also name its part and explain their function **6**

2. Solve any TWO

- a) Calculate the length of National Highway, State Highway, Major District road, Other District Road and Village road from the given data according to Nagpur Plan OR according to 20 year plan(1961-1981) for a district. **6**

Contd..

4.

Total area = $20,000 \text{ km}^2$
 Developed & agricultural area = 7500 km^2
 Undeveloped area = 5000 km^2
 Population centers as given below

Population	No. of towns
<500	450
500-1000	375
1000-2000	800
2000-5000	400
5000-10000	180
10000-20000	100
20000-50000	40
50000-100000	15
>100000	10

b) Why is road widening required on curves? Derive 6
 the formula for extra widening of road on the curve.

c) State clearly the necessity of super elevation on 6
 curved road. Derive an expression for super elevation.

3.

Solve any TWO

a) What is the purpose of traffic studies? Describe 6
 the method of origin destination survey.

b) What are the requirements of highway alignment? 6
 Explain any TWO in details.

c) Name the testing methods for determining 6
 different characteristics of road materials.
 Describe any one test to determine the characteristics of bitumen.

5

4. Solve any TWO

- a) Distinguish between flexible pavement and rigid **6** pavement. What are the different types of road failure? Explain with suitable sketches .
- b) Design a flexible pavement by CBR method using **6** following data to complete the road in 1993
1. Subgrade CBR(soaked) =3%
2. Muroom sub-base CBR(soaked)=20%
3. WBM base CBR=90%
4. Vehicles/day (in Jan 1989)=200
5.Design life=10 yrs
6.Annual increase in heavy vehicle traffic=7.5%
- c) Explain the importance of joint. Giving neat **6** sketches explain any TWO joints and their function.

5. Solve any Two

- a) Why are accident studies carried out? What are **6** the measures for reducing accidents?
- b) Describe the different between regulatory sign and **6** warning sign.What are different signs used for safety? Explain any TWO with neat sketch
- c) What are the desirable qualities of road **6** aggregates? Explain any one method to determine aggregate property.