

KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

Marks Scored:

Level : B.E.
Year : IV

Course : CIEG 401
Semester: I

Exam. Roll No.:

Time: 30 mins.

F.M. : 10

Registration No.:

Date : **JUN 18 2018**

SECTION "A"

[20Q.×0.5=10 marks]

Choose the most appropriate answer among the given choices:

1. During ductility test, the test specimen is stretched at the rate of
a) 2 cm/min b) 5 cm/min c) 6 cm/min d) 10 cm/min
2. The method of design of flexible pavement as recommended by IRC is
a) Group index method c) California Bearing Ratio method
b) Asphalt Institute method d) Westergaard method
3. When the width of kerb parking space and width of street are limited, generally preferred parking system is
a) Parallel parking c) 45° angle parking
b) 30° angle parking d) 90° angle parking
4. The percentage cross slope for mountainous type terrain ranges from
a) > 60 b) 25-60 c) 10-25 d) 0-10
5. The most common type of failure in flexible pavement which occurs due to relative movement of pavement layer materials is
a) map cracking b) pot holes c) shear failure d) reflection cracking
6. The first application of low viscous bitumen over WBM is known as
a) seal coat b) surface dressing c) tack coat d) prime coat
7. In which road construction cross-slope is provided to the sub-grade?
a) Roman Construction c) Macadam Construction
b) Telford Construction d) Tresaguet Construction
8. The maximum allowable speed for a road with horizontal curve of radius 270 m is
a) 6.71 kmph b) 68.90 kmph c) 76.90 kmph d) 86.90 kmph
9. When the bituminous surfacing is done on already existing black top road or over existing cement concrete road, the type of treatment given is
a) tack coat b) prime coat c) seal coat d) surface dressing
10. If the location of road bed is in steep hill slope and retaining wall may have to be very high, in such condition road bed is designed as
a) semi-bridge b) bench type c) semi tunnel d) flat forms

11. Arc culvert are provided
 - a) for stream with debris flow
 - b) for weak bed soil
 - c) in deep george
 - d) for economical construction
12. Bridge is a type of
 - a) retaining structure
 - b) channeling structure
 - c) divisional structure
 - d) cross drainage structure
13. Maximum spacing between consecutive expansion joint should not exceed
 - a) 10 m
 - b) 40 m
 - c) 140 m
 - d) 200 m
14. The structure constructed perpendicular to the direction of flow to dissipate the water energy and protect the bank from erosion is
 - a) retaining wall
 - b) spurs
 - c) check dam
 - d) guide bund
15. In bituminous pavement, bitumen content in the mix is determined using
 - a) GI method
 - b) Marshal method
 - c) IRC method
 - d) CBR method
16. Penetration test is not suitable for
 - a) Tar
 - b) Cut back bitumen
 - c) Straight bitumen
 - d) Bitumen emulsion
17. During engineering survey of highway location rapid reconnaissance can be done by
 - a) map study
 - b) interview with locals
 - c) aerial survey
 - d) hydrological and soil survey
18. In a highway the average spacing between vehicles is 10m, then the average density of vehicles in roadway is
 - a) 100 vehicle/km
 - b) 360 vehicle/km
 - c) 540 vehicle/km
 - d) 1000 vehicle/km
19. The renewal of wearing course of pavement surface is
 - a) routine maintenance
 - b) periodic maintenance
 - c) repair work
 - d) special repair
20. The maximum length of vehicle considered for design of roads in Nepal is
 - a) 4.75 m
 - b) 8 m
 - c) 10 m
 - d) 18 m

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SECTION "B"

Assume suitable data where necessary.

- 1.a. Briefly discuss the historical development of road construction. Explain the salient features of Telford Road Construction with appropriate sketch. [2+2]
- b. The speeds of overtaking and overtaken vehicles are 90 kmph and 70 kmph respectively. If the acceleration of the overtaking vehicle is 2.5 kmph per second, calculate the safe passing sight distance for [4]
 - i. One way traffic
 - ii. Two way traffic
 - iii. What should be the length of overtaking zone? Show the positions of sign posts.
- 2.a. Define highway alignment. Briefly explain the engineering surveys needed for locating a new highway. [1+3]
- b. Define causeway. Explain how the filter material is designed for use in sub-surface drainage system. [1+3]
- 3.a. At what conditions designer needs to introduce bridge in highway alignment? Briefly explain the different components of bridge with appropriate sketch. [2+2]
- b. Explain briefly the construction steps for water bound macadam pavement. [4]
- 4.a. Explain origin and destination study with its application. Discuss how it is conducted. [2+2]
- b. What are the various factors to be considered in pavement design? Why are flexible pavements more popular in road pavement construction? What does the CBR value of an aggregate indicate? [1+2+1]
5. Write short notes on (*Any FOUR*) [4 x 2= 8]
 - a. Shape tests of aggregate
 - b. Advantages of river route
 - c. Types of traffic capacity
 - d. Types of gradient
 - e. Highway maintenance works
 - f. Advantages of roadways

