

10. If the location of road bed in hill slope is unstable or unsuitable, then road bed is designed as:
 - a) box cutting
 - b) bench type
 - c) semi tunnel
 - d) flat forms
11. Box culverts are provided:
 - a) for stream with debris flow
 - b) in deep george
 - c) for weak bed soil
 - d) for economical construction
12. In rigid pavement, tie bars are provided along the:
 - a) transverse joint
 - b) contraction joint
 - c) expansion joint
 - d) longitudinal joint
13. Narrow track prepared along alignment of hill road to enable access for inspection during location of route is:
 - a) box cut
 - b) bench cut
 - c) trace cut
 - d) flat form
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. The machine used for compacting relatively small areas and where rollers cannot be operated is:
 - a) vibrator
 - b) rammer
 - c) watering
 - d) crusher
16. Ring and Ball test is performed to determine the _____ of bitumen.
 - a) penetration value
 - b) ductility value
 - c) grade
 - d) softening point
17. First operation during the detailed survey of a hill road is:
 - a) adjustment of alignment along with curves
 - b) derivation of longitudinal and cross-sections
 - c) fixation of B.M
 - d) hydrological and soil survey
18. In a highway there is a headway of 3.6 sec then its capacity will be:
 - a) 1000 PCU
 - b) 2400 PCU
 - c) 5400 PCU
 - d) 12,960 PCU
19. The structure construct over an obstacle to provide passage for water is:
 - a) inverted siphon
 - b) aqueduct
 - c) culvert
 - d) minor bridge
20. The maximum width of vehicle considered for design of roads in Nepal is:
 - a) 4.75 m
 - b) 3.75 m
 - c) 3.0 m
 - d) 2.5 m

KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2018

MAR 15 2018

Level : B.E.
Year : IV
Time : 2 hrs. 30 mins.

Course : CIEG 401
Semester: I
F.M. : 40

SECTION "B"

Assume suitable data where necessary.

- 1.a. Explain briefly the various forms of urban road network system. Explain how the provision of ring road minimizes the congestion in the city core areas. Take reference of Kathmandu ring road. [2+2]
- b. What are the general tests for road aggregates in order to qualify for road construction? A four lane carriageway has a curve of 220 m length and 400 m radius. The safe stopping sight distance and overtaking sight distance are 152 m and 300 m respectively. Calculate the minimum set-back distance from the inner edge of the road to the edge of the obstruction to ensure safe visibility for the both cases of sight distances if lane width is 3.75 m. [1+3]
- 2.a. What are the design and construction problems that are associated with hill roads? Enumerate the merits and demerits of river route. [2+2]
- b. Define highway drainage system. What are the requirements of good highway drainage system? At what conditions catch drains are provided? [1+2+1]
- 3.a. Why do we need to compensate grade in horizontal curve? Explain the various methods of introducing extra widening in horizontal curves with neat sketches. [1+3]
- b. Explain briefly the construction steps for water bound macadam pavement. [4]
- 4.a. Explain briefly the various aspects to be investigated during parking studies. What are the uses of these studies? [3+1]
- b. A cement concrete pavement 20 cm thick and 7.5 m wide has a longitudinal joint along the centre line. Design the diameter, length and spacing of the tie bars, if the allowable working stress in steel is 1400 kg/cm² in tension, allowable bond strength of deformed bars in concrete is 24.6 kg/cm² and coefficient of friction is 1.2. [4]
5. Write short notes on (**Any FOUR**) [4 × 2 = 8]
 - a. Requirements of ideal alignment
 - b. Roman roads
 - c. Components of bridge
 - d. Typical failures in rigid pavement
 - e. Highway maintenance works
 - f. Softening point test

