HE_IAT_18CV56

By Department of Civil Engineering, CMRIT

1. Email address *

   _____

2. Name *

   _____

3. Section *

   Mark only one oval.

   ⬭ A

   ⬭ B

4. USN *

   _____

5. For design of super elevation for mixed traffic condition. The speed is_____% of design speed *

    Mark only one oval.

    ◯ 90%

    ◯ 65%

    ◯ **75%**

    ◯ 85%

6. The centrifugal ratio for vehicle is 0.25, width of vehicle is 2.4 m. Height of C.G is 4.2 m. Lateral friction is 0.15, assuming no super elevation *

    Mark only one oval.

    ◯ **lateral skidding occur first**

    ◯ Over turning occur first

    ◯ Neither lateral skidding nor overturning

    ◯ Both simultaneously

7. The off tracking distance for a vehicle wheel base 6.5m while negotiating a curve on a single lane road with mean radius 125 m is *

   Mark only one oval.

   - **0.61**
   - 0.17
   - 0.23
   - 0.56

8. Super elevation is provided on the road *

   Mark only one oval.

   - to prevent sudden occurance of centrifugal force
   - **to counter act the centrifugal force developed on curves**
   - to facilitate the introduction of transition curve
   - to limit the rate of change of radial acceleration to the desired value

9. The max super elevation of a hilly road should not exceed *

   Mark only one oval.

   ⬭ 0.0005

   ⬭ 0.050

   ⬭ **0.1**

   ⬭ 0.8

10. The design speed of the vehicle is 100 kmph. The rate of change of centrifugal acceleration is *

    Mark only one oval.

    ⬭ 0.45 m/s3

    ⬭ 0.44 m/s2

    ⬭ **0.38 m/s3**

    ⬭ 0.33 m/s2

11. SSD and friction are *

Mark only one oval.

- ( ) Directly proportional to each other
- ( ) **Inversely proportional to each**
- ( ) Unrelated
- ( ) Inversely or directly proportional to each other based on nature

12. What is the super elevation needed for a vehicle travelling at a speed of 60 kmph on a curve of radius 128 m on a surface with f= 0.15 *

Mark only one oval.

- ( ) 6.10%
- ( ) **7.12%**
- ( ) 10%
- ( ) 5.8%

13. The ruling minimum radius of horizontal curve of a NH in plain terrain for a ruling speed of 100 kmph with e =0.07 and f = 0.15 is close to *

Mark only one oval.

( ) 250 m

( ) 300 m

( ) 36 m

( ) 360 m

14. Calculate the extra widening required in m for a two lane national highway at a horizontal curve of 300 m radius considering a wheel base of 8 m and design speed as 100 kmph *

Mark only one oval.

( ) 0.82

( ) 0.65

( ) 0.10

( ) 0.76

15. Transition curve is provided *

Mark only one oval.

○ for gradual introduction of Centrifugal force

○ To counter act centrifugal force

○ To provide super elevation

○ All

No negative marking

Multiple Choice Questions-2 marks

16. A vehicle travelling on dry level pavement at 80 kmph had the brakes applied. The vehicle travelling 76.5 m before stopping. What is coefficient of friction that has developed *

Mark only one oval.

○ 0.2

○ 0.33

○ 0.5

○ None

17. For a given road non passing sight distance is 80 m and passing sight distance is 300 m. What is Intermediate sight distance *

Mark only one oval.

○ 300 m

○ 80 m

○ 160 m

○ none

18. The safe stopping sight distance for a design speed of 50 kmph for a two lane road with a coefficient of friction 0.37 is *

Mark only one oval.

○ 61.3 m

○ 81.7 m

○ 123.7 m

○ 161.6 m

19. A test car weighing 1250 kg is travelling at a speed of 72 kmph, when it suddenly braked by locking the wheels. The average vehicle comes to a stop in adistance of 50 m. Coefficient of friction is *

Mark only one oval.

○ 0.4

○ 0.2

○ 0.3

○ None

20. The longitudinal gradient is 1 in 20 on a road. If the radius of the curve is 30 m. The compensated gradient is *

Mark only one oval.

○ 4%

○ 2.5%

○ 5%

○ 3%

21. If the camber on a sloping road is 1 in 48. Which one is ruling gradient *

Mark only one oval.

- ⬭ 1 in 15
- ⬭ 1 in 20
- ⬭ 1 in 24
- ⬭ 1 in 30

22. Flatter camber is required for the purpose of smooth traffic flow and steeper camber is required for the purpose of drainage. In which of the following situations can both these objectives be achieved *

Mark only one oval.

- ⬭ When camber slope is equal to the gradient
- ⬭ When camber slope is slightly greater than half of the gradient
- ⬭ When camber slope is equal to the half of the gradient
- ⬭ None

23. A car traveling at 22.22 mps is overtaking another car moving at 16.67 mps on a two lane divided highway. The acceleration of the overtaking car is 0.7 m/s2. The minimum overtaking sight distance is *

Mark only one oval.

○ 33.34 m

○ 236.04 m

○ 457 m

○ None

24. The absolute minimum speed is 80 kmph, what is the absolute minimum radius if e=0.07 and lateral friction is 0.15 *

Mark only one oval.

○ 230

○ 130

○ 360

○ none

25. For the load in inner and outer tyre to be equal. The super elevation needed on horizontal circular curve of radius 100 m with a design speed of 50KMPH is *

Mark only one oval.

○ 0.196

○ 0.245

○ 0.07

○ 0.1

26. A highway is designed for a speed of 65 kmph to carry mixed traffic condition, the super elevation is not to exceed 7 % and coefficient of lateral friction is 0.15. The maximum permissible speed on the horizontal curve of 125 m radius is *

Mark only one oval.

○ 30 kmph

○ 59 kmph

○ 65 kmph

○ 75 kmph

27. A 4 lane divided highway in a plain terrain is to be designed for ruling design speed of 100 kmph, the difference between fast moving vehicle and slow moving vehicle is 16 kmph. the rate of acceleration is 0.53 m/s. The safe OSD in meter is *

Mark only one oval.

○ 120

○ 330

○ 390

○ none

Multiple Choice Questions-5 marks

28. Design rate of super elevation of horizontal curve of radius 450 m for a mixed traffic condition having a design speed of 125 kmph is *

Mark only one oval.

○ 1

○ 0.05

○ 0.07

○ 0.154

29. The speed of overtaking and overtaken vehicle is 80 kmph and 50 kmph respectively. The acceleration of overtaking vehicle is 2.5 km/hr/sec. Spacing of vehicle = 16 m. Reaction time of driver 2 sec. Calculate safe OSD on one way traffic road *

Mark only one oval.

( ) 27.78 m

( ) 406.42 m

( ) 193.11 m

( ) None of the above

30. A car is moving at a speed of 72 Kmph on a road of upward gradient 2%. If the reaction time of the driver is 1.5 seconds. Assuming f=0.15, calculate the distance moved by the vehicle before the car stops finally *

Mark only one oval.

( ) 24 m

( ) 263 m

( ) 1056 m

( ) None

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Upload a SINGLE pdf file for all 5 marks and 2 marks problems. Theory questions no need. Write Name, Roll No and Section on top of the answer sheet. FILE NAME MUST BE YOUR USN

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