

Question 1

Incorrect

Mark 0.00 out of
0.20

Flag question

Which of the following requirement is given most importance in highway design?

- a. Seasonal
- b. Maintenance
- c. Structural
- d. Functional

The correct answer is: Structural

Question 2

Correct

Mark 0.25 out of
0.25

Flag question

The final step after fixing the optimum length of the road is?

- a. Financing
- b. Construction
- c. Preparation of master plan
- d. Phasing

The correct answer is: Phasing

Question 3

Correct

Mark 0.25 out of
0.25

Flag question

The economical highway can be achieved by _____

- a. More transport cost and less quality aggregate
- b. Good quality aggregate
- c. Cheap aggregate
- d. Good aggregate and less transport cost ✓

The correct answer is: Good aggregate and less transport cost

Question 4

Correct

Mark 0.25 out of
0.25

Flag question

The Nagpur plan classified the roads based on _____

- a. Location and function ✓
- b. Location
- c. Function
- d. Annual daily traffic

The correct answer is: Location and function

Question 5

Correct

Mark 0.10 out of
0.10

Flag question

The tresaguet method of laying roads was developed in the year?

- a. 1774
- b. 1764 ✓
- c. 1800
- d. 1796

The correct answer is: 1764

Question 6

Correct

Mark 0.25 out of
0.25

Flag question

The master plan may not be prepared for _____

- a. Village ✓
- b. State
- c. Country
- d. City

The correct answer is: Village

Question 7

Correct

Mark 0.10 out of
0.10

 Flag question

Once the preliminary alignments are created they are used to evaluate

- 1. Reconnaissance Survey
- 2. Terrain and soil conditions survey
- 3. Economic Evaluation
- 4. Environmental Evaluation 

Mark 2.00 out of 2.00

The correct answer is: 3. Economic Evaluation

Question 8

Incorrect

Mark 0.00 out of
0.25

 [Flag question](#)

What is the temperature used in highway pavement in degrees centigrade?

- a. 120 
- b. 175
- c. 115
- d. 130

The correct answer is: 175

Question 9

Correct

Mark 0.25 out of
0.25

 [Flag question](#)

The highway drainage system consists of how many types?

- a. Three
- b. One
- c. Four
- d. Two 

The correct answer is: Two

Question 10

Correct

Mark 0.10 out of
0.10

[Flag question](#)

Generally highway location process can be divided in to

4

separate phases. The second step of the

process is

Reconnaissance survey



Question 11

Correct

Mark 0.10 out of
0.10

[Flag question](#)

The design thickness of the CC slab of important highway with heavy traffic is?

- a. 125 mm
- b. 250 mm
- c. 275 mm
- d. 300 mm

The correct answer is: 300 mm

Question 12

Correct

Mark 0.10 out of
0.10

 [Flag question](#)

The drain which is provided parallel to roadway to intercept and divert the water from hill slopes is known as

Select one:

- a. Catch-water drain 
- b. Side drain
- c. Sloping drain
- d. Cross drain

Your answer is correct.

The correct answer is: Catch-water drain

Question 13

Correct

Mark 0.10 out of
0.10

 [Flag question](#)

The full width of land acquired before finalizing a highway, alignment is known

Select one:

- a. Roadway
- b.  

Question 14

Correct

Mark 0.10 out of
0.10

 Flag question

What factor(s) generally will not be considered when locating a highway.

Select one or more:

- a. Topography
- b. Soil characteristics
- c. Noise Pollution
- d. Temperature ✓
- e. Availability Electric Power ✓

Your answer is correct.

The correct answers are: Temperature, Availability Electric Power

Question 15

Incorrect

Mark 0.00 out of
0.10[Flag question](#)

The roads that connect the district headquarters to important city of other state is called _____

- a. National Highway
- b. Major district road X
- c. State Highway
- d. Other district road

The correct answer is: State Highway

Question 16

Correct

Mark 0.10 out of
0.10[Flag question](#)

In hill roads the side drains are provided

Select one:

- a. Only on the hill side of road ✓
- b. Only on the opposite side of hill
- c. On both sides of road
- d. None of the above

Question 17

Correct

Mark 0.10 out of
0.10[Flag question](#)

The main features of the roman road do not include the following?

- a. They were built straight
- b. They were strong ✓
- c. They excavated soft soil till hard strata was obtained
- d. The total thickness was 0.75m to 1.2m

The correct answer is: They were strong

Question 18

Correct

Mark 0.25 out of
0.25[Flag question](#)

Highway should be planned for _____

- a. Traffic developments
- b. Present requirements and future requirements ✓
- c. Traffic studies
- d. Present requirements

The correct answer is: Present requirements and future requirements

Question 19

Incorrect

Mark 0.00 out of
0.25[Flag question](#)

The New highway project is divided into how many stages?

- a. One
- b. Three
- c. Four ✖
- d. Two

The correct answer is: Three

Question 20

Correct

Mark 0.25 out of
0.25[Flag question](#)

Which of the following measure is not adopted in the reconstruction of a new highway?

- a. Use of modern machinery
- b. Providing effective drainage system
- c. Use of inferior quality material ✓
- d. Designing as per traffic

The correct answer is: Use of inferior quality material

Question 21

Correct

Mark 0.10 out of
0.10[Flag question](#)

Once the preliminary alignments are created they are used to evaluate

- 1. Reconnaissance Survey
- 2. Terrain and soil conditions survey
- 3. Economic Evaluation
- 4. Environmental Evaluation ✓

Mark 2.00 out of 2.00

The correct answer is: 3. Economic Evaluation

Question 22

Correct

Mark 0.25 out of
0.25[Flag question](#)

The phases of highway planning do not include the following?

- a. Preparation of master plan
- b. Assessment of road length requirement
- c. Showing the phasing of a plan in five year plan
- d. Financing ✓

Question 23

Correct

Mark 0.10 out of
0.10 Flag question

Pick up the correct statement from the following:

Select one:

- a. Borrow pits may be located on either side of the right of way
- b. Spoil bank is located on one side of the right of way
- c. Borrow pits are located outside the right of way
- d. All the above ✓

Your answer is correct.

The correct answer is: All the above

Question 24

Correct

Mark 0.10 out of
0.10 Flag question

Generally highway location process can be divided in to

- | | |
|----|---|
| 4 |  separate phases. Third step of the process |
| is | Preliminary location survey  |

Curve3

For a roadway with a design speed of 100 km/h, for which a maximum super elevation rate of 5.5% has been selected. What is the minimum radius of curvature?

Design speed (km/h)	Side friction
30	0.33
40	0.30
50	0.25
60	0.23
70	0.20
85	0.18
100	0.15
120	0.15

Answer: 48.78 ×

The correct answer is: 384.098

Curve2

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the tangent distance in meters.

- A=139.398 mE, 256.839 mN
- B=215.283 mE, 372.688 mN
- I=214.685 mE, 497.687 mN
- Curve length =439 m.



Answer:

 X

The correct answer is: 225.975

Curve3

In a 5 degree curve it is needed to provide 6.56 d 49 m 40 s angle of deviation. Determine the curve length in meters. (Where degree of curvature is defined as the angle in the center for a 100 m arc)

Answer:



Curve

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the Angle of Deviation in decimal degrees.

- A=121.848 mE, 246.855 mN
- B=182.743 mE, 488.907 mN
- I=186.35 mE, 363.959 mN



Answer: ✖

The correct answer is: 30.500

Question 6

Not answered

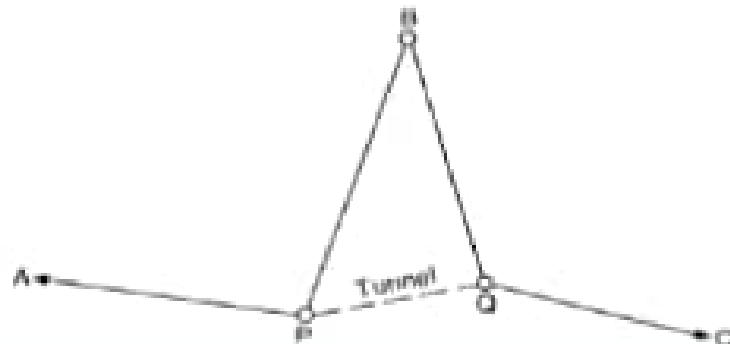
Marked out of
1.0

 Flag question

Tunnel

Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 304.917 decimal degrees
- PB = 256.583 m
- APB = 105.975 decimal degrees
- QB = 231.698 m
- W.C.B of QC = 125.422 decimal degrees
- CQB = 109.717
- Co-ordinates of P = 200.00 E 200.00 N Using the data provided, calculate the length of PQ in m.



Answer: 

The correct answer is: 149.483

[Finish review](#)

Question 1

Correct

Mark 0.20 out of
0.20[Flag question](#)

Categories of Dense Graded Asphalt Mixtures

Dense graded asphalt mixtures are generally grouped divided into three categories

dependent on their end specific use:

Wearing course

mixtures, binder course

mixtures, and

base course

mixtures.

Question 2

Correct

Mark 0.20 out of
0.20[Flag question](#)

When designing different asphalt mixtures they are made to satisfy different performance criteria, such as:

Select one:

- a. Bulk density, drainage, strength, and colour
- b. skid resistance, drainage, strength, and water proofing.
- c. skid resistance, drainage, specific gravity, and water proofing
- d. Heat absorbtion, drainage, strength, and water

Your answer is correct.

The correct answer is: skid resistance, drainage, strength, and water proofing.

Question 3

Correct

Mark 0.20 out of
0.20

Flag question

There are several laboratory methods or procedure available to achieve these goals. The most common are

Select one:

- a. the Marshall method, the AASHTO method, and the SuperPave method.
- b. the Stefen method, the Hveem method, and the SuperPave method.
- c. the Stefen method, the Hveem method, and the Indian method.
- d. the Marshall method, the Hveem method, and the SuperPave method.

Your answer is correct.

The correct answer is: the Marshall method, the Hveem method, and the SuperPave method.

Question 4

Correct

Mark 0.20 out of
0.20

Flag question

In designing an asphalt mixtures the highest strength mixture design is the best choice for the particular asphalt pavement application.

Select one:

- True
- False

The correct answer is 'False'.

Question 5

Correct

Mark 0.20 out of
0.20

 Flag question

Asphalt cements occurred naturally.

Select one:

True ✓

False

The correct answer is 'True'.

Question 6

Correct

Mark 1.00 out of
1.00

Flag question

The following table shows data recorded for a Marshall mix design. Answer the question below based on this data

volumetric calculation information

Material	Measured specific gravity	Weight of total mixture (%)
Coarse aggregate	2.352	
Crushed sand	2.43	
Natural sand	2.487	
Mineral filler	2.731	
Asphalt binder	0.95	4.2
The compacted mixture, bulk	2.138	
Uncompacted mixture, measured maximum	2.274	

Determine the bulk specific gravity of the combined aggregates:

Answer:

The correct answer is: 2.398

Question 7

Correct

Mark 1.00 out of
1.00

Flag question

Based on the data provided in the above table answer the question.

Determine the effective specific gravity of the combined aggregates:

$$G_{se}$$

Answer:

The correct answer is: 2.422

Question 8

Incorrect

Mark 0.00 out of
1.00

Flag question

Based on the data provided in the above data

Determine the amount of asphalt absorbed as a percentage of the total weight of aggregates.

$$P_{ba}$$

Answer:

The correct answer is: 0.392

Question 9

Incorrect

Mark 0.00 out of
1.00[Flag question](#)

Based on the data provided in the above data

Determine effective asphalt content in paving mixture (percent by weight).

$$P_{be}$$

Answer: 4.205 x

The correct answer is: 3.824

Question 10

Correct

Mark 1.00 out of
1.00[Flag question](#)

Determine the air voids in the total compacted asphalt mixture.

$$P_a$$

Answer: 5.980 ✓

The correct answer is: 6.00

Question 11

Correct

Mark 1.00 out of
1.00[Flag question](#)

Assuming that the effective specific gravity of the aggregates is constant with varying levels of asphalt content obtain the maximum specific gravity if the percent by weight of asphalt in the paving mixture is 6.9%.

Answer: 2.1873 ✓

Question 12

Correct

Mark 1.00 out of
1.00[Flag question](#)

Determine the percent voids in compacted mineral aggregates (VMA).

VMA

Answer: ✓

The correct answer is: 14.60

Question 13

Incorrect

Mark 0.00 out of
1.00[Flag question](#)

Determine the percentage of voids filled with asphalt in the compacted mixture.

VFA

Answer: ✗

The correct answer is: 71.24

Question 14

Partially correct

Mark 8.10 out of
9.00

Remove flag

Ring and Ball Test

The test is used to determine the Softening point ✓ of bitumen. The result of the ring and ball test on bitumen is given in terms of Temperature ✓ . The ring used in the test is a brass ✓ . The steel ball 9.53 ✓ mm in diameter, weighing between 3.45 ✓ ✓ and 3.55 ✓ grams.

The apparatus is assembled with the rings, the appropriate thermometer, and ball guides in position, and the bath is filled to a height of 40 ✗ mm above the upper surface of the rings with freshly boiled distilled ✓ water at a temperature of 5 °C when the softening point is below 80 °C, the water temperature being maintained at 5 °C for 5 ✓ min.

During the experiment allow the beaker to be heated at a uniform rate of 5 ± 0.5 ✓ °C/min.

Question 15

Not answered

Marked out of
1.00[Flag question](#)

During a test to determine the specific gravity of bitumen, the dry weight (121.0 g) of the pycnometer and stopper is obtained, and the pycnometer is filled with distilled water at the prescribed temperature. The weight (169.3 g) of the water and pycnometer together is determined. A small sample of the material is heated gradually to facilitate flow and then poured into the pycnometer and left to cool to the specified temperature. The weight of pycnometer and material then is obtained (150.8 g). Water is poured into the pycnometer to completely fill the remaining space not occupied by the material. The weight of the filled pycnometer is obtained (179.7 g).

Answer:



The correct answer is: 1.54

Question 16

Not answered

Marked out of
1.00[Flag question](#)

In order to determine the specific gravity the dry weight (121.0 g) of the pycnometer and stopper is obtained, and the pycnometer is filled with distilled water at the prescribed temperature. The weight (169.3 g) of the water and pycnometer together is determined. Then the pycnometer is be filled completely with the material at the specified temperature after pouring out the water. The weight then is obtained (161.7 g).

Answer:



Test was carried to determine the bulk specific gravity of HMA Marshall sample. The sample is weighed in air (1239) and in water (693.84). Determine the bulk specific gravity of the sample.

Answer:



The correct answer is: 1.27

Question 1

Correct

Mark 1.00 out of
1.00

Flag question

Flexible pavement is to be designed according to the AASHTO 1993 guidelines. Assuming that in the calculation process all layer thicknesses are rounded up to the nearest 0.5 inches. Calculate the design depth of Layer 3. You may use the figure below for your reference.

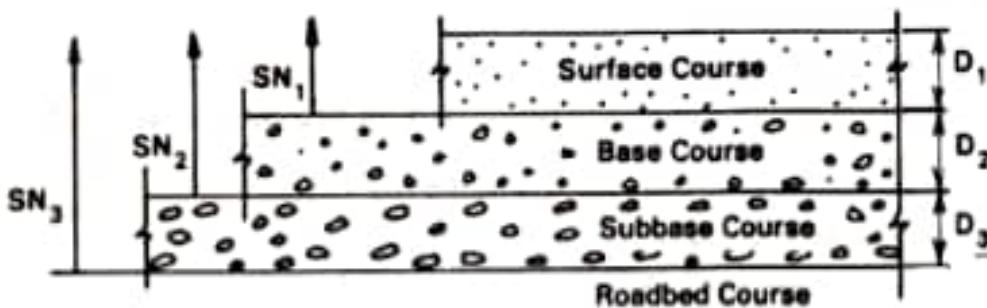


Table 1 Structural-Layer Coefficients

Pavement component	Coefficient
Wearing surface	
Sand-mix asphaltic concrete	0.35
Hot-mix asphaltic (HMA) concrete	0.44
Base	
Crushed stone	0.14
Dense-graded crushed stone	0.18
Soil cement	0.2
Emulsion/aggregate-bituminous	0.3
Portland cement/aggregate	0.4
Lime-pozzolan/aggregate	0.4
Hot-mix asphaltic (HMA) concrete	0.4
Subbase	
Crushed stone	0.11

The wearing surface is made up of HMA followed by a dense-graded crushed stone base and crushed stone sub base. The drainage modifying factor for layer 1, 2 and 3 are 1, 0.95 and 0.8. Design structural numbers of layer 1, 2, 3 are 1.9, 4 and 5.2 respectively.

Determine the layer thickness of layer 1 (rounded up to nearest 0.5 inches)

Answer: 4.5



Question 2

Correct

Mark 1.00 out of
1.00[Flag question](#)

Determine the layer thickness of layer 2 (rounded up to the nearest 0.5 inches)

Answer:

The correct answer is: 12.00

Question 3

Incorrect

Mark 0.00 out of
1.00[Flag question](#)

Determine the layer thickness of layer 3 (rounded up to the nearest 0.5 inches)

Answer:

The correct answer is: 1.50

Question 4

Correct

Mark 1.00 out of
1.00[Flag question](#)

Given $p_t = 2.6$ and $SN = 5.6$, determine the EALF for a 41.3-kip single axle load.

Answer:

The correct answer is: 22.90

Question 5

Correct

Mark 1.00 out of
1.00[Flag question](#)

Given $p_t = 2.6$ and $SN = 5.6$, determine the EALF for a 41.3-kip tandem axle load.

Answer: 2.38828



The correct answer is: 2.39

Question 6

Incorrect

Mark 0.00 out of
1.00[Flag question](#)

Given $p_t = 2.6$ and $SN = 5.6$, determine the EALF for a 41.3-kip tridem axle load.

Answer: 19.442



The correct answer is: 0.54

EQUIVALENT AXLE LOAD FACTOR

Single Axles

Axle loads (kip)	The terminal serviceability = 2.5			
	Pavement Structural No	1	2	3
2		0.000	0.000	0.000
4		0.003	0.004	0.004
6		0.011	0.017	0.017
8		0.032	0.047	0.051
10		0.078	0.102	0.118
12		0.168	0.198	0.229
14		0.328	0.358	0.399
16		0.591	0.613	0.645
18		1.000	1.000	1.000
20		1.608	1.569	1.495
22		2.480	2.376	2.175
24		3.690	3.492	3.093
26		5.328	4.995	4.310
28		7.495	6.978	5.897
30		10.307	9.547	7.935
32		13.898	12.822	10.517
34		18.415	16.936	13.745
36		24.022	22.039	17.733
38		30.904	28.296	22.609
40		39.260	35.890	28.512
42		49.311	45.020	35.596
44		61.299	55.905	44.029
46		75.485	68.782	53.991
48		92.152	83.907	65.681
50		111.606	101.557	79.310
				60.084

Tandem Axles

The terminal serviceability = 2.5

Axle loads (kip)	Pavement Structural Num			
	1	2	3	4
2	0.000	0.000	0.000	0.000
4	0.001	0.001	0.000	0.000
6	0.002	0.002	0.002	0.001
8	0.004	0.006	0.005	0.004
10	0.008	0.013	0.011	0.009
12	0.015	0.024	0.023	0.018
14	0.026	0.041	0.042	0.033
16	0.044	0.065	0.070	0.057
18	0.070	0.097	0.109	0.092
20	0.107	0.141	0.162	0.141
22	0.160	0.198	0.229	0.207
24	0.231	0.273	0.315	0.292
26	0.327	0.370	0.420	0.401
28	0.451	0.493	0.548	0.534
30	0.611	0.648	0.703	0.695
32	0.813	0.843	0.889	0.887
34	1.065	1.082	1.111	1.113
36	1.376	1.376	1.376	1.376
38	1.755	1.731	1.688	1.679
40	2.212	2.158	2.056	2.027
42	2.760	2.667	2.488	2.426
44	3.411	3.269	2.992	2.880
46	4.178	3.976	3.577	3.395
48	5.076	4.803	4.254	3.980
50	6.120	5.762	5.034	4.740

Axle loads (kip)	Pavement Structural Nt			
	1	2	3	4
2	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000
6	0.001	0.001	0.001	0.000
8	0.001	0.002	0.001	0.001
10	0.003	0.004	0.003	0.002
12	0.005	0.007	0.006	0.004
14	0.008	0.012	0.010	0.008
16	0.012	0.019	0.018	0.013
18	0.018	0.029	0.028	0.021
20	0.027	0.042	0.042	0.032
22	0.038	0.058	0.060	0.048
24	0.053	0.078	0.084	0.068
26	0.072	0.103	0.114	0.095
28	0.098	0.133	0.151	0.128
30	0.129	0.169	0.195	0.170
32	0.169	0.213	0.247	0.220
34	0.219	0.266	0.308	0.281
36	0.279	0.329	0.379	0.352
38	0.352	0.403	0.461	0.436
40	0.439	0.491	0.554	0.533
42	0.543	0.594	0.661	0.644
44	0.666	0.714	0.781	0.769
46	0.811	0.854	0.918	0.911
48	0.979	1.015	1.072	1.069
50	1.174	1.201	1.245	1.246

The directional distribution of a four-lane road is 70/30. Total ESAL in the base year was found to be 3.9×10^6 lane distribution factor for the design lane 0.4 and the road is to be designed for 16 year life. The vehicle growth factor of the road is 9 %. Determine the cumulative equivalent standard axle load for one lane.

Answer:

36039711.36



ESAL



Correct

Mark 1.00 out
of 1.00

¶ Ray
question

Given $p_t = 2.5$ and $SN = 5.0$, determine the truck factor for the following vehicle if the front axle has a load of 6 kip and the rear axle has a load of 31 kip.



Answer: 0.3756 ✘

The correct answer is: 0.75

Question 9

Correct

Mark 1.00 out
of 1.00

¶ Ray
question

An axle weight study of 986 vehicles on a section of a highway gave the following data on axle-load distribution:

Axle Load Group: Single (1000 lb)	No. of Axles	Axle Load Group: Tandem (1000 lb)
< 4	394	< 6
4–8	542	6–12
8–12	345	12–18
12–16	197	18–24

Assuming a SN value of 5 and a p_t value of 2.5, determine the truck factor for this section of the highway. You may use the EALF values provided in the tables above.

Answer: 0.1388696 ✓

The correct answer is: 0.11

Consider the data gathered in a traffic survey of an area.
Design life of the road is 16 years.

CLASS GROUP	DESCRIPTION	NO. OF AXLES
1	MOTORCYCLES	2
2	ALL CARS/CATS CARS W/1-AXLE TRAILER CARS W/2-AXLE TRAILER	2 3 4
3	PICKUPS & VANS 1&2 AXLE TRAILERS	2, 3, 4, 5
4	BUSES	2&3
5	2-AXLE SINGLE UNIT	2
6	3-AXLE SINGLE UNIT	3
7	4-AXLE SINGLE UNIT	4
HEAVY TRUCKS	3-AXLE TRACTOR, 1-AXLE TRAILER (3&1)	3
	2-AXLE TRACTOR, 3-AXLE TRAILER (2&3)	4
	3-AXLE TRACTOR, 1-AXLE TRAILER (3&1)	4
8	4-AXLE TRACTOR, 3-AXLE TRAILER (3&2)	5
	5-AXLE TRACTOR W/ 1-AXLE TRAILER	6
9	TRACTOR W/ SINGLE TRAILER	4 & 5
10	5-AXLE SEMI-TRAILER	5
11	6-AXLE MULTI-TRAILER	6
12	ANY 7 OR MORE AXLES	7 or more
13	NOT JRD	
15	UNKNOWN VEHICLE TYPE	

FHWA Class Group	FHWA Vehicle Classification	Axle Load ($\times 10^3$ kips)		Annual Growth Rate (%)
2	Cars	Front	2.0	7.1
		Rear	2.0	
3	Pickup and vans	Front	8.0	7.1
		Rear	15.0	
4	Buses	Front	20.0	7.1
		Rear	30.0	
5	2-axle single unit	Front	15.0	3.7
		Rear	20.0	
6	3-axle single unit	Front	15.0	3.7
		Rear	30.0	

Determine the value of GF1.

Answer: 28.12 ✓

Question 11

Correct

Mark 0.25 out
of 0.25 Flag
question

Determine the value of GF2.

Answer:

The correct answer is: 21.31

Question 12

Correct

Mark 0.25 out
of 0.25 Flag
question

Determine TF1

Answer:

The correct answer is: 0.00

Question 13

Correct

Mark 0.25 out
of 0.25 Flag
question

Determine TF2

Answer:

The correct answer is: 0.49

[Finish review](#)



Curve

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the Angle of Deviation in decimal degrees.

- A=114.648 mE, 242.759 mN
- B=147.602 mE, 482.135 mN
- I=174.551 mE, 360.075 mN





Question 1

Incorrect

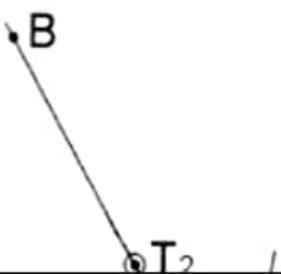
Mark 0.0 out of 1.0

Flag question

Curve

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the Angle of Deviation in decimal degrees.

- A=114.648 mE, 242.759 mN
- B=147.602 mE, 482.135 mN
- I=174.551 mE, 360.075 mN





Answer:

38.500



The correct answer is: 39.500

Question 2



40	0.30
50	0.25
60	0.23
70	0.20
85	0.18
100	0.15
120	0.15

Answer:



The correct answer is: 488.593





Question 2

Incorrect

Mark 0.0 out of 0.5

Flag question

Curve3

For a roadway with a design speed of 110 km/h, for which a maximum super elevation rate of 4.5% has been selected. What is the minimum radius of curvature?

Design speed (km/h)	Side friction
-------------------------	---------------

30	0.33
----	------

40	0.30
----	------

50	0.25
----	------

60	0.23
----	------

70	0.20
----	------

85	0.18
----	------

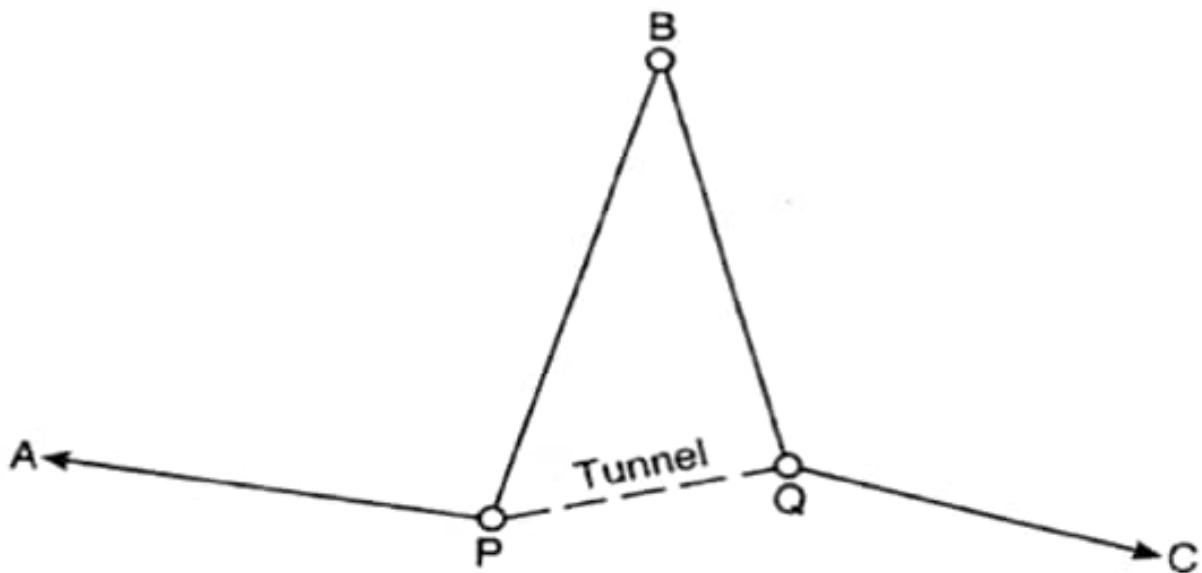
100	0.15
-----	------

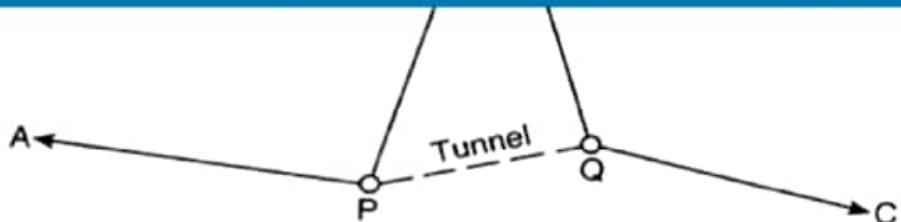
Tunnel

Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 287.367 decimal degrees
- PB = 238.799 m
- APB = 92.091 decimal degrees
- QB = 210.092 m
- W.C.B of QC = 116.764 decimal degrees
- CQB = 126.994
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the length of PQ in m.





Answer:

384.098



The correct answer is: 118.301

Question 4

Incorrect

Mark 0.0 out of 0.5

Flag question

Curve3





Question 3

Incorrect

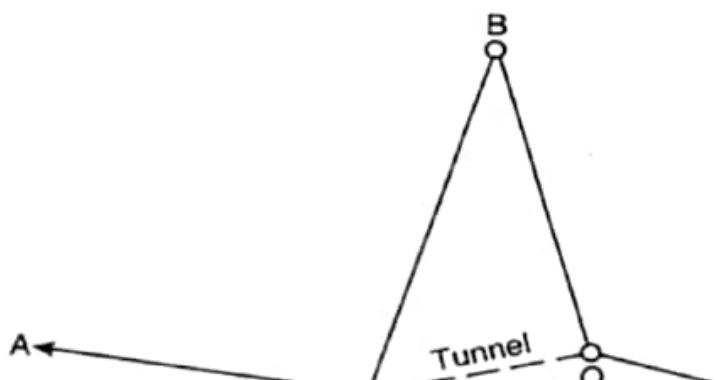
Mark 0.0 out of 1.0

[Flag question](#)

Tunnel

Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 287.367 decimal degrees
 - PB = 238.799 m
 - APB = 92.091 decimal degrees
 - QB = 210.092 m
 - W.C.B of QC = 116.764 decimal degrees
 - CQB = 126.994
 - Co-ordinates of P = 200.00 E 200.00 N
- Using the data provided, calculate the length of PQ in m.





Question 4

Incorrect

Mark 0.0 out of 0.5

[Flag question](#)

Curve3

In a 4 degree curve it is needed to provide 19.104 d 16 m 30 s angle of deviation.

Determine the curve length in meters.

(Where degree of curvature is defined as the angle in the center for a 100 m arc)

Answer:

135.914

The correct answer is: 484.475

Question 5



Question 5

Incorrect

Mark 0.0 out of 0.5

[Flag question](#)

Curve2

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the tangent distance in meters.

- A=139.398 mE, 256.839 mN
- B=215.283 mE, 372.688 mN
- I=214.685 mE, 497.687 mN
- Curve length =439 m.





- $B = 215.283 \text{ mE}, 372.688 \text{ mN}$
- $I = 214.685 \text{ mE}, 497.687 \text{ mN}$
- Curve length = 439 m.



Answer:

169

✗

The correct answer is: 225.975



- $B = 215.283 \text{ mE}, 372.688 \text{ mN}$
- $I = 214.685 \text{ mE}, 497.687 \text{ mN}$
- Curve length = 439 m.



Answer:

169

✗

The correct answer is: 225.975



▼

Question 6

Incorrect

Mark 0.0 out of 0.5

Flag question

Tunnel

Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 308.967 decimal degrees
- PB = 260.687 m APB = 109.179 decimal degrees
- QB = 236.684 m
- W.C.B of QC = 127.42 decimal degrees
- CQB = 105.73
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the WCB of QB in decimal degrees.

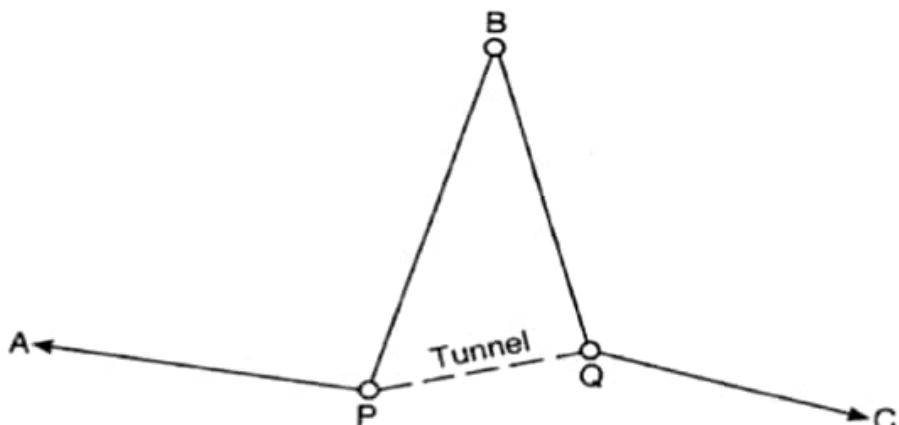




degrees

- QB = 236.684 m
- W.C.B of QC = 127.42 decimal degrees
- CQB = 105.73
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the WCB of QB in decimal degrees.



Answer:

345.224



The correct answer is: 21.690

Finish review



▼

Answer:

345.224



The correct answer is: 21.690

[Finish review](#)[◀ HED 05](#)[Jump to...](#)[Chapter 3 Notes ►](#)

Quiz navigation

D.L.A.M.L. Udayasiri

- | | | | | | |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|

[Show one page at a time](#)



Question 1

Correct

Mark 0.10 out of 0.10

Flag question

Surveying techniques can be grouped into three general categories:

Select one:

- a. Ground surveys, Remote sensing,
From meteorological dept
- b. Ground surveys, Remote sensing, ✓
Computer graphics
- c. From villagers, Remote sensing,
Computer graphics
- d. From villagers, range finders,
Snipers





▼

Select one:

- a. Ground surveys, Remote sensing,
From meteorological dept
- b. Ground surveys, Remote sensing, ✓
Computer graphics
- c. From villagers, Remote sensing,
Computer graphics
- d. From villagers, range finders,
Snipers
- e. Ground surveys, Remote sensing,
From villagers

Your answer is correct.

The correct answer is: Ground surveys,
Remote sensing, Computer graphics

Question 2

Incorrect

Mark 0.00 out of 0.10



Remote sensing, Computer graphics

Question 2

Incorrect

Mark 0.00 out of 0.10

[Flag question](#)

In hill roads the side drains are provided

Select one:

- a. Only on the opposite side of hill
- b. None of the above
- c. Only on the hill side of road
- d. On both sides of road X

Your answer is incorrect.

The correct answer is: Only on the hill side of road



Question 4

Partially correct

Mark 0.05 out of 0.10

[Flag question](#)

What factor(s) generally will not be considered when locating a highway.

Select one or more:

- a. Temperature ✓
- b. Availability Electric Power
- c. Soil characteristics
- d. Noise Pollution
- e. Topography

Your answer is partially correct.

You have correctly selected 1.

The correct answers are: Temperature,
Availability Electric Power



Question 5

Incorrect

Mark 0.00 out of 0.25

[Flag question](#)

Which of the following materials are not included in highway construction?

- a. Soil
- b. Petrol
- c. Dust X
- d. Stone

The correct answer is: Petrol

Question 6

Incorrect

Mark 0.00 out of 0.25



Question 7

Incorrect

Mark 0.00 out of 0.10

[Flag question](#)

The data required for the decision process are usually obtained from different types of surveys, depending on the factors being considered. Which of the following pair is a survey method used in Highway location.

Select one:

- a. Remote Sensing, GIS
- b. Remote Sensing, Aerial Photographs
- c. Triangulation Survey, Remote Survey
- d. Traverse Survey, Internet Survey

Your answer is incorrect.

The correct answer is: Remote Sensing, Aerial Photographs



Question 3

Incorrect

Mark 0.00 out of 0.10

[Flag question](#)

Once the preliminary alignments are created
they are used to evaluate

- 1. Reconnaissance Survey X
- 2. Terrain and soil conditions survey
- 3. Economic Evaluation
- 4. Environmental Evaluation

Mark 0.00 out of 2.00

The correct answer is: 3. Economic
Evaluation



Question 11

Correct

Mark 0.25 out of 0.25

Flag question

The surveys of highway alignment are completed in how many stages?

- a. Three
- b. Two
- c. Four
- d. One

The correct answer is: Four

Question 12

Partially correct

Mark 0.05 out of 0.10



▼

Question 6

Incorrect

Mark 0.00 out of 0.25

[Flag question](#)

Which is the most preferred type of transition curve by IRC for highways?

- a. Cubic parabola
- b. Parabola
- c. Lemniscate
- d. Spiral

The correct answer is: Parabola

Question 7

Incorrect

Mark 0.00 out of 0.10

[Flag question](#)



Question 10

Incorrect

Mark 0.00 out of 0.25

Flag question

Which of the following measure is not adopted in the reconstruction of a new highway?

- a. Designing as per traffic
- b. Use of modern machinery X
- c. Use of inferior quality material
- d. Providing effective drainage system

The correct answer is: Use of inferior quality material

Question 11



Question 9

Incorrect

Mark 0.00 out of 0.25

Flag question

The current highway development works in India are undertaken by?

- a. NHDP
- b. Govt. of India X
- c. NHAI
- d. State governments

The correct answer is: NHAI

Question 10

Incorrect

Mark 0.00 out of 0.25

Flag question



Question 14

Incorrect

Mark 0.00 out of 0.25

[Flag question](#)

The surface of the highway pavement should be designed to allow _____

- a. Very high rolling resistance
- b. Low rolling resistance
- c. No rolling resistance
- d. High rolling resistance X

The correct answer is: Low rolling resistance

Question 15

Correct

Mark 0.10 out of 0.10



Question 8

Correct

Mark 0.25 out of 0.25

[Flag question](#)

As per the Nagpur plan, the un-surfaced roads were meant for _____

- a. National highway
- b. Other district road and village road ✓
- c. State highway
- d. Major district road

The correct answer is: Other district road and village road

Question 9

Incorrect

Mark 0.00 out of 0.25



Question 16

Correct

Mark 0.10 out of 0.10

[Flag question](#)

The design thickness of the CC slab of important highway with heavy traffic is?

- a. 125 mm
- b. 275 mm
- c. 300 mm ✓
- d. 250 mm

The correct answer is: 300 mm

Question 17

Correct

Mark 0.25 out of 0.25

[Flag question](#)



Question 17

Correct

Mark 0.25 out of 0.25

[Flag question](#)

Planning is based on _____

- a. Factual data
- b. Analysis
- c. Scientific data
- d. Factual data and analysis ✓

The correct answer is: Factual data and analysis

Question 18

Incorrect

Mark 0.00 out of 0.20

[Flag question](#)



Question 12

Partially correct

Mark 0.05 out of 0.10

Flag question

Generally highway location process can be divided in to

4

separate phases. Third step of the process is

Reconnaissance survey



Question 13

Partially correct

Mark 0.05 out of 0.10

Flag question



Question 20

Correct

Mark 0.10 out of 0.10

Flag question

The drain which is provided parallel to roadway to intercept and divert the water from hill slopes is known as

Select one:

- a. Cross drain
- b. Catch-water drain ✓
- c. Sloping drain
- d. Side drain

Your answer is correct.

The correct answer is: Catch-water drain

Question 21



Question 15

Correct

Mark 0.10 out of 0.10

[Flag question](#)

The final step after fixing the optimum length of the road is?

- a. Preparation of master plan
- b. Financing
- c. Construction
- d. Phasing

The correct answer is: Phasing

Question 16

Correct



Question 13

Partially correct

Mark 0.05 out of 0.10

Flag question

Generally highway location process can be divided in to

4

separate phases. First step of the process is

Preliminary location survey



Question 14

Incorrect

Mark 0.00 out of 0.25

Flag question



Question 22

Incorrect

Mark 0.00 out of 0.10

[Flag question](#)

The determination of optimum length is based on _____

- a. Length of highway
- b. Type of highway
- c. Saturation system
- d. Geometric design

The correct answer is: Saturation system

Question 23

Incorrect

Mark 0.00 out of 0.25

[Flag question](#)



Question 18

Incorrect

Mark 0.00 out of 0.20

Flag question

The utility unit as per saturation system for a population of less 1001 to 2000 is?

- a. 2.00
- b. 0.25 X
- c. 0.50
- d. 1.00

The correct answer is: 1.00

Question 19

Incorrect

Mark 0.00 out of 0.20



Question 23

Incorrect

Mark 0.00 out of 0.25

[Flag question](#)

Which of the following does not include in the phases of highway planning?

- a. Preparation of master plan
- b. Assessment of road length requirement
- c. Showing the phasing of a plan in the five-year plan X
- d. Financing

The correct answer is: Financing



Question 19

Incorrect

Mark 0.00 out of 0.10

[Flag question](#)

Once the preliminary alignments are created
they are used to evaluate

- 1. Reconnaissance Survey
- 2. Terrain and soil conditions survey
- 3. Economic Evaluation
- 4. Environmental Evaluation

Mark 0.00 out of 2.00

The correct answer is: 3. Economic
Evaluation



Question 24

Incorrect

Mark 0.00 out of 0.25

[Flag question](#)

Which of the following is the longest international highway?

- a. Karakoram highway
- b. Pan-American highway
- c. Trans-Canada highway X
- d. Australia highway 1

The correct answer is: Pan-American highway

[Finish review](#)

[Quiz navigation](#)



Question 21

Incorrect

Mark 0.00 out of 0.10

[Flag question](#)

The cross drainage structure of a highway is considered in which aspect?

- a. Maintenance aspects
- b. Highway factors
- c. Road user amenities
- d. Highway traffic factors

The correct answer is: Highway factors

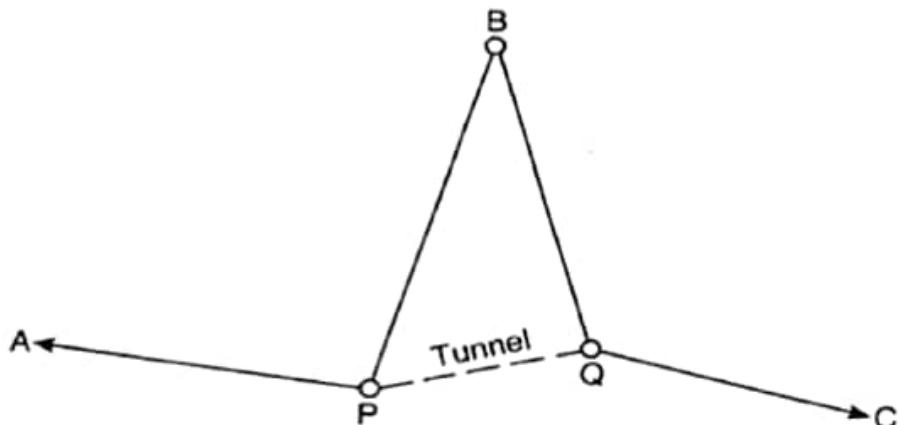
Question 22

Incorrect

Mark 0.00 out of 0.10



Using the data provided, calculate the length of PQ in m.



Answer:

190.678



The correct answer is: 180.743

Question 2

Not answered





Question 1

Incorrect

Mark 0.0 out of 1.0

Flag question

Tunnel

Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 320.667 decimal degrees
 - PB = 272.543 m
 - APB = 118.435 decimal degrees
 - QB = 251.088 m
 - W.C.B of QC = 133.192 decimal degrees
 - CQB = 94.212
 - Co-ordinates of P = 200.00 E 200.00 N
- Using the data provided, calculate the length of PQ in m.





▼

(km/h)

30	0.33
40	0.30
50	0.25
60	0.23
70	0.20
85	0.18
100	0.15
120	0.15

Answer:

X

The correct answer is: 527.376



Question 2

Not answered

Marked out of 0.5

Flag question

Curve3

For a roadway with a design speed of 120 km/h, for which a maximum super elevation rate of 6.5% has been selected. What is the minimum radius of curvature?

Design speed (km/h)	Side friction
30	0.33
40	0.30
50	0.25
60	0.23
70	0.20
85	0.18
100	0.15



Question 3

Incorrect

Mark 0.0 out of 0.5

[Flag question](#)

Tunnel

Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 302.217 decimal degrees
- PB = 253.847 m APB = 103.839 decimal degrees
- QB = 228.374 m
- W.C.B of QC = 124.09 decimal degrees
- CQB = 112.375
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the WCB of QB in decimal degrees.

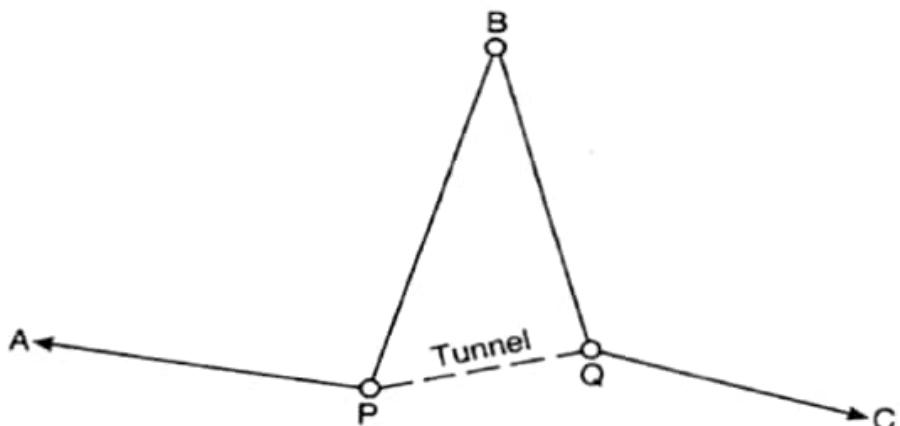




▼

- W.C.B of QC = 124.09 decimal degrees
- CQB = 112.375
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the WCB of QB in decimal degrees.



Answer:

348.282



The correct answer is: 11.715

Question 4

Incorrect

Mark 0.0 out of 1.0



Question 4

Incorrect

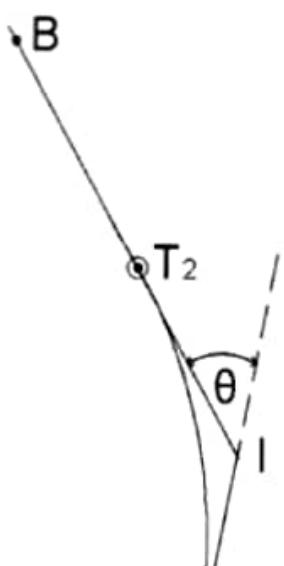
Mark 0.0 out of 1.0

Flag question

Curve

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the Angle of Deviation in decimal degrees.

- A=101.598 mE, 235.335 mN
- B=150.668 mE, 477.573 mN
- I=153.301 mE, 352.601 mN





- $I = 153.301 \text{ mE}, 352.601 \text{ mN}$



Answer:

36.6



The correct answer is: 25.000

Question 5



which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the tangent distance in meters.

- A=116.898 mE, 244.039 mN
- B=178.233 mE, 361.307 mN
- I=183.928 mE, 486.177 mN
- Curve length =415 m.



Answer:



Question 5

Not answered

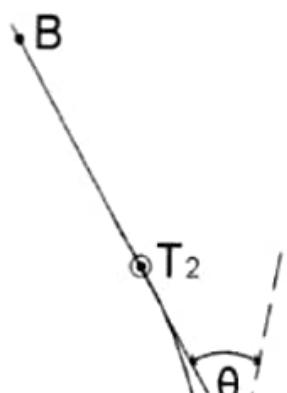
Marked out of 0.5

Flag question

Curve2

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the tangent distance in meters.

- A=116.898 mE, 244.039 mN
- B=178.233 mE, 361.307 mN
- I=183.928 mE, 486.177 mN
- Curve length =415 m.





Question 6

Not answered

Marked out of 0.5

Flag question

Curve3

In a 5 degree curve it is needed to provide
15.52 d 22 m 40 s angle of deviation.

Determine the curve length in meters.

(Where degree of curvature is defined as the
angle in the center for a 100 m arc)

Answer:

The correct answer is: 317.956

[Finish review](#)

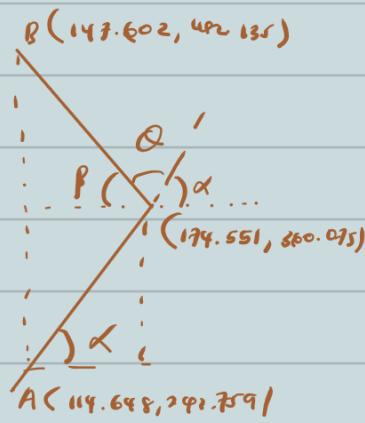
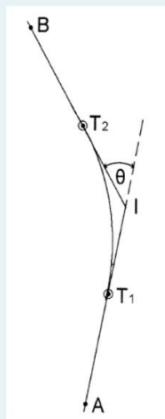
[Quiz navigation](#)



Curve

Figure below shows a left hand circular curve which is to be set out with running chain-age of 20 m between the tangent points T₁ and T₂. From the data given, calculate the Angle of Deviation in decimal degrees.

- A=114.648 mE, 242.759 mN
- B=147.602 mE, 482.135 mN
- I=174.551 mE, 360.075 mN



$$\alpha = \tan^{-1} \left(\frac{360.075 - 242.759}{174.551 - 114.648} \right)$$

$$= 62.95$$

$$\beta = \tan^{-1} \left(\frac{482.135 - 360.075}{147.602 - 174.551} \right)$$

$$= 77.55$$

$$\underline{\underline{\alpha = 39.5}}$$

The correct answer is: 39.500

Question 2
Incorrect
Mark 0.0 out of 0.5
[Flag question](#)

Curve3
For a roadway with a design speed of 110 km/h, for which a maximum super elevation rate of 4.5% has been selected. What is the minimum radius of curvature?

Design speed (km/h)	Side friction
30	0.33
40	0.30
50	0.25
60	0.23
70	0.20
85	0.18
100	0.15

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	40	50	60	70	85	100	120
Answer:	0.30	0.25	0.23	0.20	0.18	0.15	0.15

372.609 X

The correct answer is: 488.593

$$R \geq \frac{v^2}{127(0.15 + 0.61 \times 4.5)}$$

$$R \geq \frac{110^2}{127(0.15 + 0.61 \times 4.5)}$$

$$R \geq 488.953$$

$$\underline{\underline{R_{min} = 488.953 \text{ m}}}$$

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Question 5
Incorrect
Mark 0.0 out of 0.5
[Flag question](#)

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- B=215.283 mE, 372.688 mN
- I=214.685 mE, 497.687 mN
- Curve length =439 m.

Answer:
169 X

The correct answer is: 225.975

$$\alpha = \tan^{-1} \left(\frac{497.687 - 256.839}{214.685 - 139.598} \right) = 72.64^\circ$$

$$\beta = 89.73^\circ$$

$$\therefore \theta = 180 - \alpha - \beta = 17.63^\circ$$

$$S = R\theta$$

$$439 = R \times \left(\frac{17.63 \times \pi}{180} \right)$$

$$R = 1926.71 \text{ m}$$

$$T = R \tan(\theta/2)$$

$$= 1926.71 \times \tan\left(\frac{17.63}{2}\right) = \underline{\underline{221.25 \text{ m}}} \quad (?)$$



Mark 0.0 out of 1.0

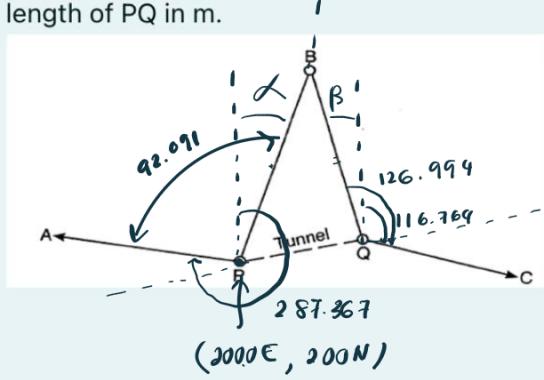
Flag question

Tunnel

Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 287.367 decimal degrees
- PB = 238.799 m
- APB = 92.091 decimal degrees
- QB = 210.092 m
- W.C.B of QC = 116.764 decimal degrees
- CQB = 126.994
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the length of PQ in m.



The correct answer is: 118.301

$$\alpha = 19.458^\circ \quad \times$$

$$\beta = 10.23^\circ \quad \times$$

$$WCB \text{ of } PB = (\alpha)$$

$$WCB \text{ of } BQ = (180 - \beta)$$

$$BE = 200 + PB \sin \alpha$$

$$= 200 + 238.799 \times \sin(19.458^\circ)$$

$$= 279.55$$

$$BN = 200 + PB \cos(\alpha)$$

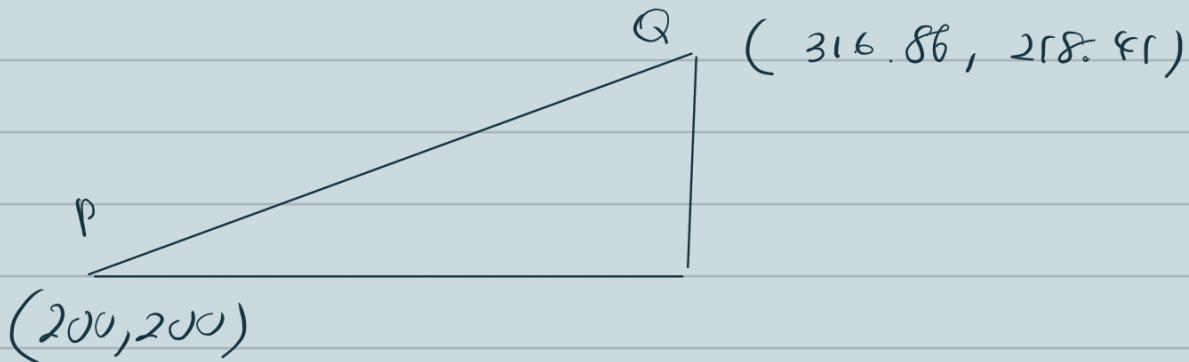
$$= 425.16$$

$$QE = 279.55 + 210.092 \sin(180 - \beta)$$

$$= 316.86$$

$$QN = 425.16 + 210.092 \cos(180 - \beta)$$

$$= 218.41$$



$$PQ = \sqrt{(316.86 - 200)^2 + (218.41 - 200)^2}$$

$$= 118.301 \text{ m}$$

**Question 4**

Incorrect

Mark 0.0 out of 0.5

[Flag question](#)**Curve3**

In a 4 degree curve it is needed to provide 19.104 d 16 m 30 s angle of deviation. Determine the curve length in meters. (Where degree of curvature is defined as the angle in the center for a 100 m arc)

Answer:

135.914



The correct answer is: 484.475

Question 5

Incorrect

$$\theta = 19.379 \\ (19^\circ 16' 30'')$$

Degree of Curvature,

$$100m = R \cdot Q \times \frac{\pi}{180}$$

$$100 = R \times \frac{4 \times \pi}{180}$$

$$R = 1432.39 \text{ m}$$

Curve length,
 $L = \left(\frac{R Q \pi}{180} \right)$

$$L = \left(\frac{1432.39 \times 19.379 \times \pi}{180} \right)$$

$$L = \underline{484.475}$$

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Question 6
Incorrect
Mark 0.0 out of 0.5
[Flag question](#)

Tunnel
Figure below shows a proposed tunnel PQ which is to be set out from each end.

- W.C.B of PA = 308.967 decimal degrees
- PB = 260.687 m APB = 109.179 decimal degrees
- QB = 236.684 m
- W.C.B of QC = 127.42 decimal degrees
- CQB = 105.73
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the WCB of QB in decimal degrees.

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degrees

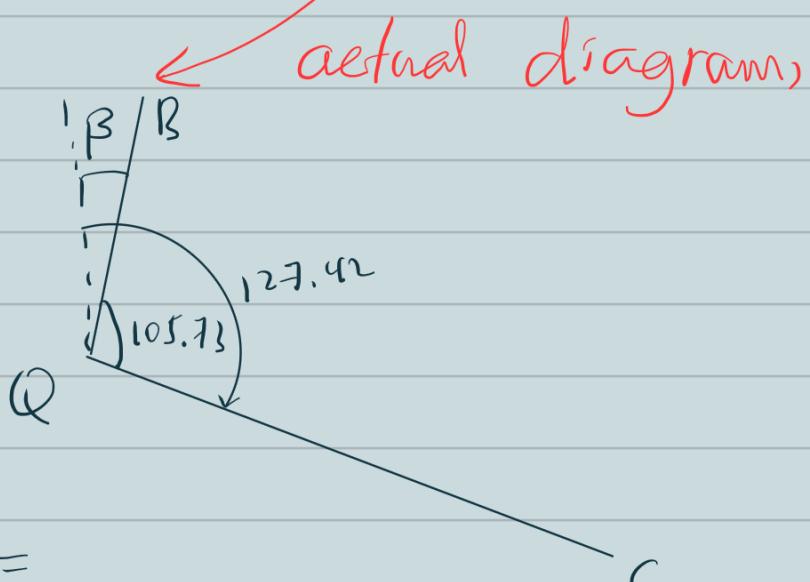
- QB = 236.684 m
- W.C.B of QC = 127.42 decimal degrees
- CQB = 105.73
- Co-ordinates of P = 200.00 E 200.00 N

Using the data provided, calculate the WCB of QB in decimal degrees.

Answer: 345.224 ✖

The correct answer is: 21.690

[Finish review](#)



$$\begin{aligned}
 \text{WCB of QB} &= \\
 &127.42 - 105.73 \\
 &= \underline{\underline{21.69}}
 \end{aligned}$$

Bulk specific gravity(G_{sb}) =

$$\frac{P_1(\text{weight of total aggregate}(\%)) + P_2(\text{weight of total aggregate}(\%)) + P_3(\text{weight of total aggregate}(\%))}{\frac{P_1}{\text{Measured specific gravity}(G_1)} + \frac{P_2}{\text{Measured specific gravity}(G_2)} + \frac{P_3}{\text{Measured specific gravity}(G_3)}}$$

Specific gravity of the combined aggregate = G_{se}

measured specific gravity of uncompacted mixture measured maximum= G_{mm}

Weight of total mixture of asphalt binder = G_b

measured specific gravity of asphalt binder = P_b

percentage of the total weight of aggregates = P_{ba}

Effective asphalt content in paving mixture (percent by weight) = P_{be}

Total asphalt mixture = P_a

measured specific gravity of Compacted mixture bulk= G_{mb}

Maximum specific gravity = G_{man}

Weight of asphalt in the paving mixture = P_x

$$G_{se} = \frac{100 - P_b}{\frac{100}{G_{mm}} - \frac{P_b}{G_b}}$$

$$P_{ba} = \left(\frac{G_{se} - G_{se}}{G_{se} \times G_{sb}} \right) G_{sb} \times 100$$

$$Ps = 100 - P_b$$

$$P_{be} = P_b - \frac{P_{ba} \times Ps}{100}$$

$$P_a = \left(\frac{G_{mm} - G_{mb}}{G_{mm}} \right) \times 100$$

$$VMA = 100 - \frac{G_{mb}}{G_{sb}} \times Ps$$

$$VFA = \left(\frac{VMA - P_a}{VMA} \right) \times 100$$

$$G_{man} = \frac{G_{mm} - (100 - P_x)}{100}$$

Dry weight = x

Water and pycnometer together =y

The weight of pycnometer and material = z

The weight of pycnometer filled =p

$$W_b = z - x$$

$$W_w = y - x$$

$$W_f = z - x$$

$$\text{Specific gravity of bitumen} = \frac{W_b}{W_b \times W_w - W_f}$$

Bulk specific gravity of HMA =

the sample is weighted in air

the sample is weighted in air - weighted in water