SLR-TX – 50

Seat No.	

Set P

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Reaction time of a driver
   a) increases with increase in speed
   b) decreases with increase in speed
   c) is same for all speeds
   d) none of the above

2) Bottom most layer of pavement is known as
   a) wearing course b) base course
   c) sub-base course d) subgrade

3) The terrain may be classified as rolling terrain if the cross slope of land is
   a) upto 10% b) between 10% and 25%
   c) between 25% and 60% d) more than 60%

4) Rapid curing cutback bitumen is produced by blending bitumen with
   a) Kerosene b) Petrol c) Diesel d) Benzene

5) For highway geometric design purposes the speed used is
   a) 15^{th} percentile b) 50^{th} percentile
   c) 85^{th} percentile d) 98^{th} percentile

P.T.O.

6) For the design of super elevation for mixed traffic conditions, the speed is reduced by
   a) 15% b) 20% c) 25% d) 75%
7) Widening of curve on horizontal curve is required for _____ purpose.
   a) Mechanical b) Psychological
   c) Both a) and b) d) None of these
8) Spacing of the contraction joint is
   a) 4.0 m to 5.0 m b) 5.0 m to 6.0 m
   c) 6.0 m to 7.0 m d) 7.0 m to 8.0 m
9) Equivalent radius of resisting section for 20 cm thick slab, given that the radius of contact area of wheel load is 15 cm is
   a) 15.07 cm b) 14.07 cm c) 16.07 cm d) 17.07 cm
10) Critical combination of stresses at edge in rigid pavement during winter mid-day are
   a) Load stress + Warping stress
   b) Load stress + Warping stress + frictional stress
   c) Load stress + warping stress – frictional stress
   d) Load stress – Warping stress + frictional stress
11) Construction joint in rigid pavement is provided where
   a) Concreting work is started at the start of the day
   b) Temperature of the concrete is more
   c) Concreting work is stopped at the end of the day
   d) Contraction and expansion is required
12) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods
13) What is the correct sequence of the following events of construction of a shaft in a rock ?
   1) Drilling and blasting 2) Timbering
   3) Pumping 4) Mucking
   Select the correct answer using the codes given below.
   a) 1, 2, 3, 4 b) 1, 4, 2, 3 c) 2, 1, 4, 3 d) 2, 4, 1, 3
14) PPP stands for
   a) Private Public Partnership b) Public Private Partnership
   c) Partnership Public Private d) Public Provident Partnership

_____

Set P

SLR-TX – 50

Seat No.	

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure on r**ight** indicates **full** marks.*
*3) Assume suitable data **wherever** needed and mention it **clearly**.*

SECTION – I

2. Solve **any two** (**7 marks each**) :

a) Calculate the minimum sight distance required to avoid a head-on collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.7 and a brake efficiency of 50 percent, in either case. **7**

b) A two lane national highway passing through a rolling terrain has a horizontal curve of radius 500 m. Design the length of transition curve and shift of the curve. Assume Design speed = 80 kmph, length of wheel base = 6 m, width of pavement = 7 m. Rate of introduction of super eleveation = 1 in 150. **7**

c) Write a detailed note on “Volume and Speed Studies”. **7**

3. Solve **any two** (**7 marks each**) :

a) Enlist different tests carried out on Bituminous material. Explain any one in detail with neat sketch and its practical application. **7**

b) Discuss the importance of Highway Drainage. **7**

c) Write a detailed note on applications of Geosynthetics in road construction. **7**

Set P

SECTION – II

4. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Draw a neat sketch of cross section of two lane flexible pavement and show the component parts. Enumerate the functions and importance of each component of the pavement.

b) Enumerate the construction steps of Cement Concrete pavement.

c) It is proposed to widen the existing two lane National Highway section to 4-lane divided road. Design the pavement for new carriageway using IRC guidelines.

Input data :

1) Initial traffic in each direction on counting year, N = 4000 cv/day
2) Construction period since last traffic count, x = 3 years
3) Design life = 15 years
4) Design CBR of Subgrade soil to be employed, = 8%
5) Traffic Growth Rate, r = 8%
6) Vehicle Damage Factor as per axle load survey, F = 4.0
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-4 to 6 of IRC-37-2012.

5. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Calculate the annual cost of a stretch of higway from the following data.

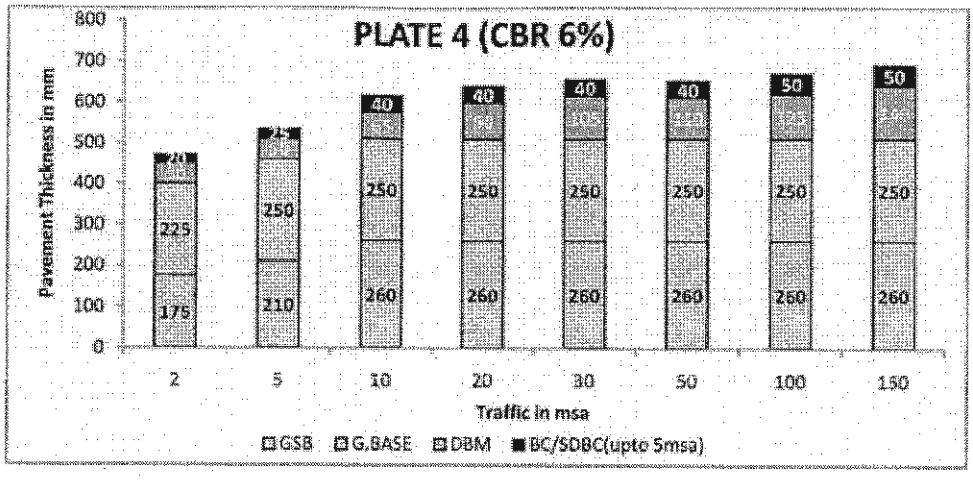
Item	Total Cos, Rs. In Lakhs	Estimated Life, years	Rate of Interest, %
Land	35	100	6
Earth work	40	40	8
Bridges, culverts & Drainage	50	60	8
Pavement	100	15	10
Traffic signs and road appurtenaces	15	5	10

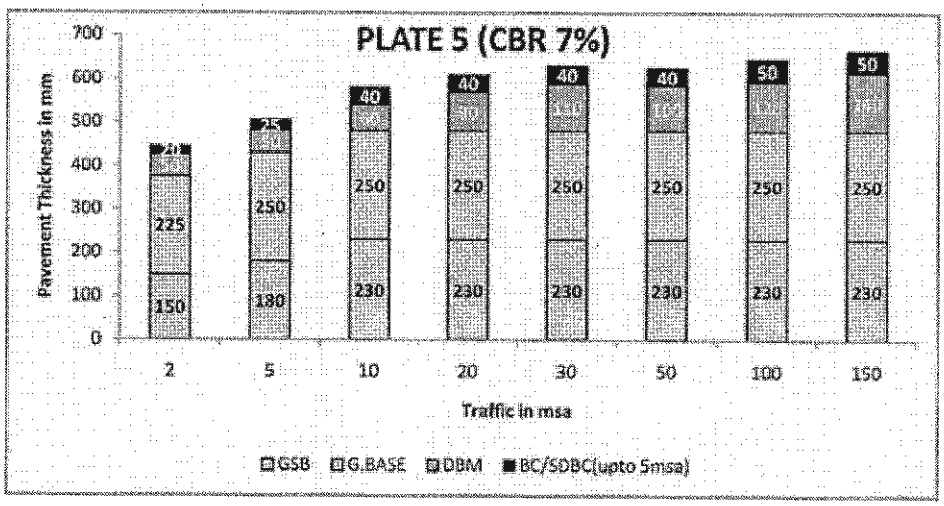
The average cost of maintenance of the road is Rs. 1.5 lakhs per year.

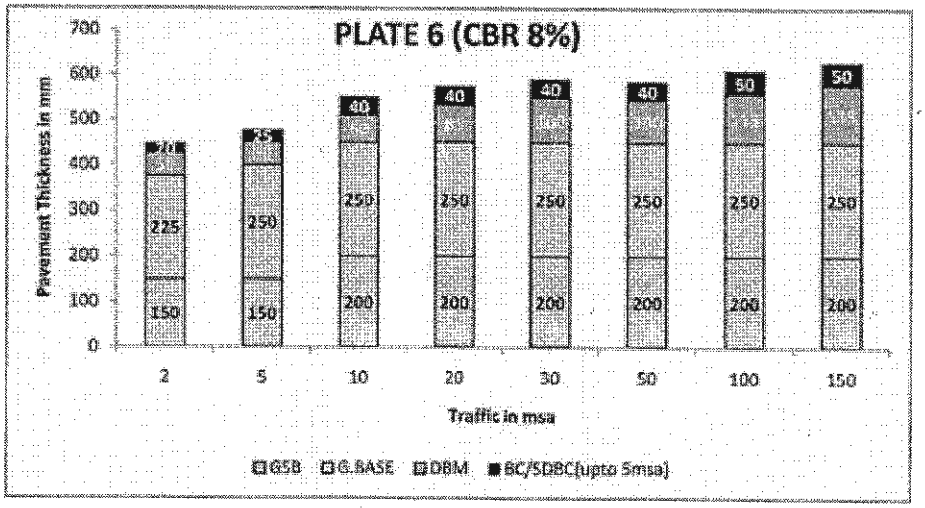
b) What are the advantages of implementing PPP projects for highway development in India ?

c) Describe heading and bench method of tunneling in hard rock with neat sketch.

Set P







Set P

SLR-TX – 50

Seat No.	

Set Q

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Spacing of the contraction joint is
   a) 4.0 m to 5.0 m b) 5.0 m to 6.0 m
   c) 6.0 m to 7.0 m d) 7.0 m to 8.0 m

2) Equivalent radius of resisting section for 20 cm thick slab, given that the radius of contact area of wheel load is 15 cm is
   a) 15.07 cm b) 14.07 cm c) 16.07 cm d) 17.07 cm

3) Critical combination of stresses at edge in rigid pavement during winter mid-day are
   a) Load stress + Warping stress
   b) Load stress + Warping stress + frictional stress
   c) Load stress + warping stress – frictional stress
   d) Load stress – Warping stress + frictional stress

4) Construction joint in rigid pavement is provided where
   a) Concreting work is started at the start of the day
   b) Temperature of the concrete is more
   c) Concreting work is stopped at the end of the day
   d) Contraction and expansion is required

P.T.O.

5) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods

6) What is the correct sequence of the following events of construction of a shaft in a rock ?
   1) Drilling and blasting 2) Timbering
   3) Pumping 4) Mucking
   Select the correct answer using the codes given below.
   a) 1, 2, 3, 4 b) 1, 4, 2, 3 c) 2, 1, 4, 3 d) 2, 4, 1, 3

7) PPP stands for
   a) Private Public Partnership b) Public Private Partnership
   c) Partnership Public Private d) Public Provident Partnership

8) Reaction time of a driver
   a) increases with increase in speed
   b) decreases with increase in speed
   c) is same for all speeds
   d) none of the above

9) Bottom most layer of pavement is known as
   a) wearing course b) base course
   c) sub-base course d) subgrade

10) The terrain may be classified as rolling terrain if the cross slope of land is
   a) upto 10% b) between 10% and 25%
   c) between 25% and 60% d) more than 60%

11) Rapid curing cutback bitumen is produced by blending bitumen with
   a) Kerosene b) Petrol c) Diesel d) Benzene

12) For highway geometric design purposes the speed used is
   a) 15^{th} percentile b) 50^{th} percentile
   c) 85^{th} percentile d) 98^{th} percentile

13) For the design of super elevation for mixed traffic conditions, the speed is reduced by
   a) 15% b) 20% c) 25% d) 75%

14) Widening of curve on horizontal curve is required for _____ purpose.
   a) Mechanical b) Psychological
   c) Both a) and b) d) None of these

_____

Set Q

SLR-TX – 50

Seat No.	

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure on r**ight** indicates **full** marks.*
*3) Assume suitable data **wherever** needed and mention it **clearly**.*

SECTION – I

2. Solve **any two** (**7 marks each**) :

a) Calculate the minimum sight distance required to avoid a head-on collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.7 and a brake efficiency of 50 percent, in either case. **7**

b) A two lane national highway passing through a rolling terrain has a horizontal curve of radius 500 m. Design the length of transition curve and shift of the curve. Assume Design speed = 80 kmph, length of wheel base = 6 m, width of pavement = 7 m. Rate of introduction of super eleveation = 1 in 150. **7**

c) Write a detailed note on “Volume and Speed Studies”. **7**

3. Solve **any two** (**7 marks each**) :

a) Enlist different tests carried out on Bituminous material. Explain any one in detail with neat sketch and its practical application. **7**

b) Discuss the importance of Highway Drainage. **7**

c) Write a detailed note on applications of Geosynthetics in road construction. **7**

Set Q

SECTION – II

4. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Draw a neat sketch of cross section of two lane flexible pavement and show the component parts. Enumerate the functions and importance of each component of the pavement.

b) Enumerate the construction steps of Cement Concrete pavement.

c) It is proposed to widen the existing two lane National Highway section to 4-lane divided road. Design the pavement for new carriageway using IRC guidelines.

Input data :

1) Initial traffic in each direction on counting year, N = 4000 cv/day
2) Construction period since last traffic count, x = 3 years
3) Design life = 15 years
4) Design CBR of Subgrade soil to be employed, = 8%
5) Traffic Growth Rate, r = 8%
6) Vehicle Damage Factor as per axle load survey, F = 4.0
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-4 to 6 of IRC-37-2012.

5. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Calculate the annual cost of a stretch of higway from the following data.

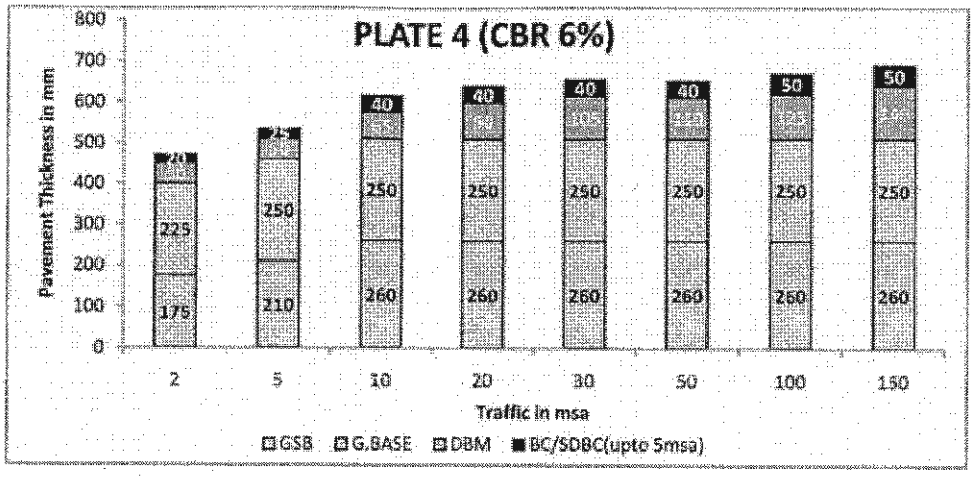
Item	Total Cos, Rs. In Lakhs	Estimated Life, years	Rate of Interest, %
Land	35	100	6
Earth work	40	40	8
Bridges, culverts & Drainage	50	60	8
Pavement	100	15	10
Traffic signs and road appurtenaces	15	5	10

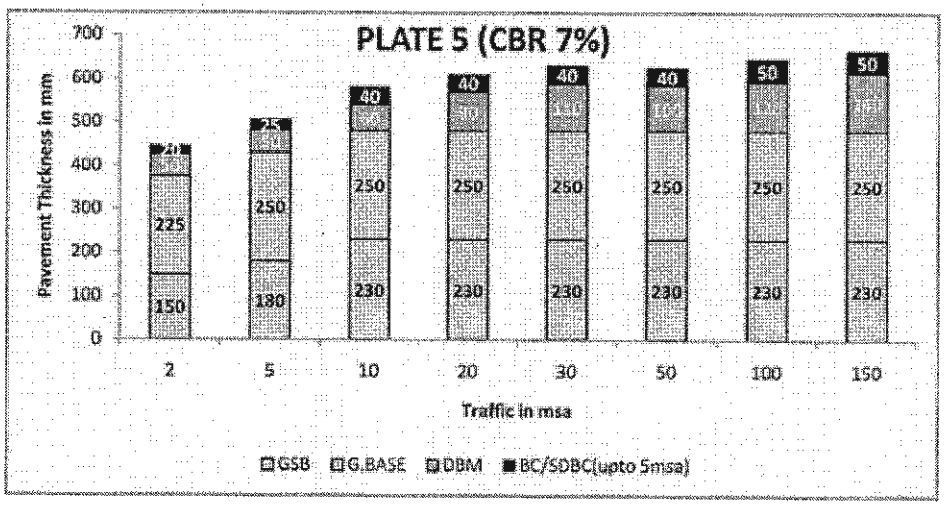
The average cost of maintenance of the road is Rs. 1.5 lakhs per year.

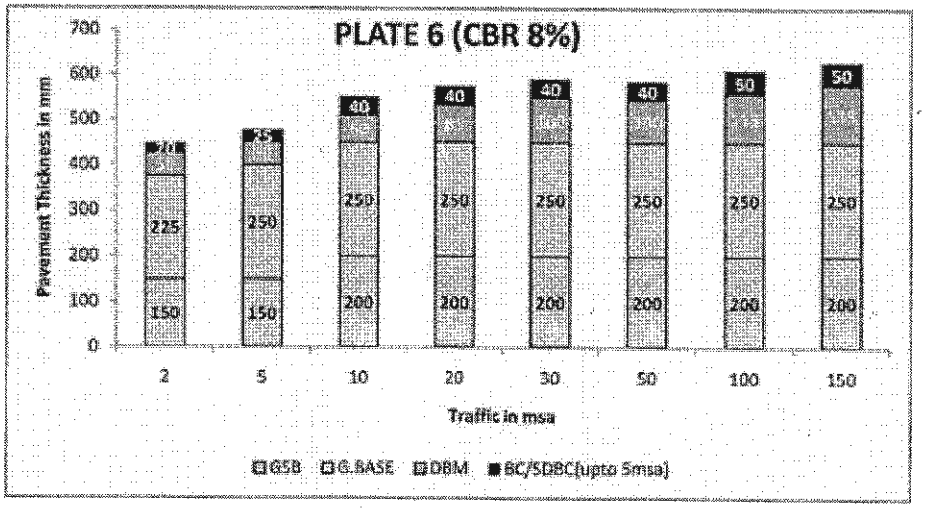
b) What are the advantages of implementing PPP projects for highway development in India ?

c) Describe heading and bench method of tunneling in hard rock with neat sketch.

Set Q







Set Q

SLR-TX – 50

Seat No.	

Set R

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) For highway geometric design purposes the speed used is
   a) 15^{th} percentile b) 50^{th} percentile
   c) 85^{th} percentile d) 98^{th} percentile

2) For the design of super elevation for mixed traffic conditions, the speed is reduced by
   a) 15% b) 20% c) 25% d) 75%

3) Widening of curve on horizontal curve is required for _____ purpose.
   a) Mechanical b) Psychological
   c) Both a) and b) d) None of these

4) Spacing of the contraction joint is
   a) 4.0 m to 5.0 m b) 5.0 m to 6.0 m
   c) 6.0 m to 7.0 m d) 7.0 m to 8.0 m

5) Equivalent radius of resisting section for 20 cm thick slab, given that the radius of contact area of wheel load is 15 cm is
   a) 15.07 cm b) 14.07 cm c) 16.07 cm d) 17.07 cm

6) Critical combination of stresses at edge in rigid pavement during winter mid-day are
   a) Load stress + Warping stress
   b) Load stress + Warping stress + frictional stress
   c) Load stress + warping stress – frictional stress
   d) Load stress – Warping stress + frictional stress

P.T.O.

7) Construction joint in rigid pavement is provided where
   a) Concreting work is started at the start of the day
   b) Temperature of the concrete is more
   c) Concreting work is stopped at the end of the day
   d) Contraction and expansion is required

8) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods

9) What is the correct sequence of the following events of construction of a shaft in a rock ?
   1) Drilling and blasting 2) Timbering
   3) Pumping 4) Mucking
   Select the correct answer using the codes given below.
   a) 1, 2, 3, 4 b) 1, 4, 2, 3 c) 2, 1, 4, 3 d) 2, 4, 1, 3

10) PPP stands for
   a) Private Public Partnership b) Public Private Partnership
   c) Partnership Public Private d) Public Provident Partnership

11) Reaction time of a driver
   a) increases with increase in speed
   b) decreases with increase in speed
   c) is same for all speeds
   d) none of the above

12) Bottom most layer of pavement is known as
   a) wearing course b) base course
   c) sub-base course d) subgrade

13) The terrain may be classified as rolling terrain if the cross slope of land is
   a) upto 10% b) between 10% and 25%
   c) between 25% and 60% d) more than 60%

14) Rapid curing cutback bitumen is produced by blending bitumen with
   a) Kerosene b) Petrol c) Diesel d) Benzene

SLR-TX – 50

Seat No.	

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure on r**ight** indicates **full** marks.*
*3) Assume suitable data **wherever** needed and mention it **clearly**.*

SECTION – I

2. Solve **any two** (**7 marks each**) :

a) Calculate the minimum sight distance required to avoid a head-on collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.7 and a brake efficiency of 50 percent, in either case. **7**

b) A two lane national highway passing through a rolling terrain has a horizontal curve of radius 500 m. Design the length of transition curve and shift of the curve. Assume Design speed = 80 kmph, length of wheel base = 6 m, width of pavement = 7 m. Rate of introduction of super eleveation = 1 in 150. **7**

c) Write a detailed note on “Volume and Speed Studies”. **7**

3. Solve **any two** (**7 marks each**) :

a) Enlist different tests carried out on Bituminous material. Explain any one in detail with neat sketch and its practical application. **7**

b) Discuss the importance of Highway Drainage. **7**

c) Write a detailed note on applications of Geosynthetics in road construction. **7**

Set R

SECTION – II

4. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Draw a neat sketch of cross section of two lane flexible pavement and show the component parts. Enumerate the functions and importance of each component of the pavement.

b) Enumerate the construction steps of Cement Concrete pavement.

c) It is proposed to widen the existing two lane National Highway section to 4-lane divided road. Design the pavement for new carriageway using IRC guidelines.

Input data :

1) Initial traffic in each direction on counting year, N = 4000 cv/day
2) Construction period since last traffic count, x = 3 years
3) Design life = 15 years
4) Design CBR of Subgrade soil to be employed, = 8%
5) Traffic Growth Rate, r = 8%
6) Vehicle Damage Factor as per axle load survey, F = 4.0
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-4 to 6 of IRC-37-2012.

5. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Calculate the annual cost of a stretch of higway from the following data.

Item	Total Cos, Rs. In Lakhs	Estimated Life, years	Rate of Interest, %
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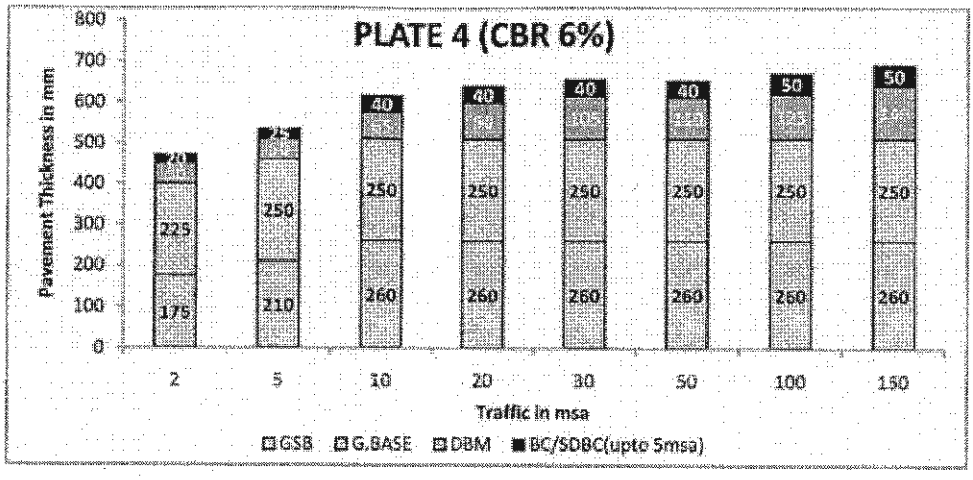
Earth work	40	40	8
Bridges, culverts & Drainage	50	60	8
Pavement	100	15	10
Traffic signs and road appurtenaces	15	5	10

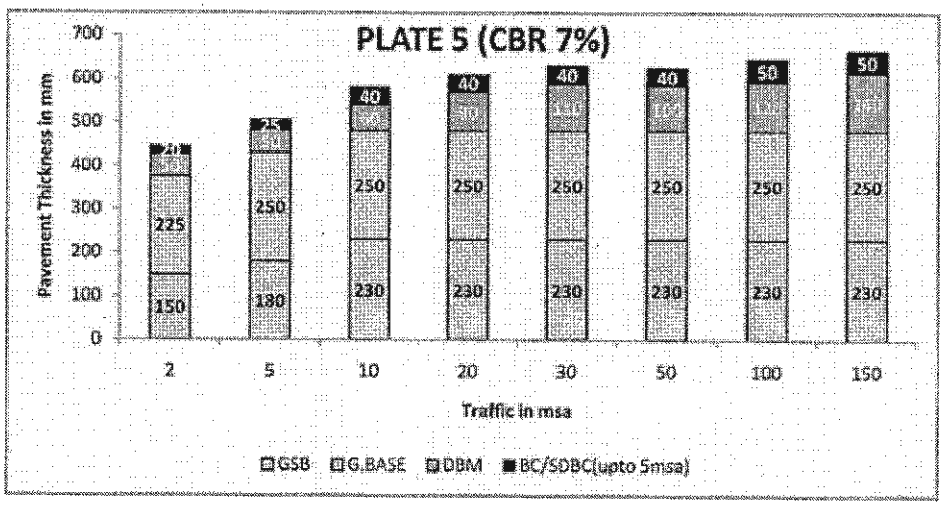
The average cost of maintenance of the road is Rs. 1.5 lakhs per year.

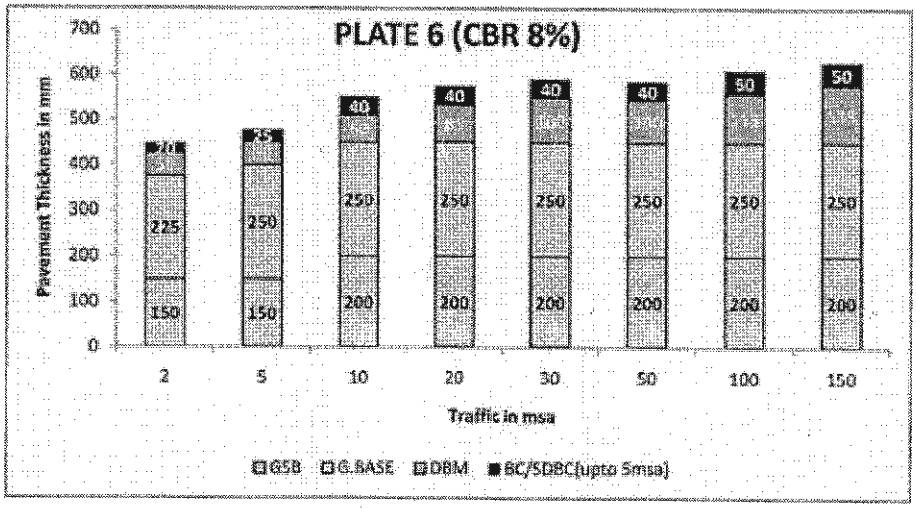
b) What are the advantages of implementing PPP projects for highway development in India ?

c) Describe heading and bench method of tunneling in hard rock with neat sketch.

Set R







Set R

Set R

SLR-TX – 50

Seat No.	

Set S

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Critical combination of stresses at edge in rigid pavement during winter mid-day are
   a) Load stress + Warping stress
   b) Load stress + Warping stress + frictional stress
   c) Load stress + warping stress – frictional stress
   d) Load stress – Warping stress + frictional stress

2) Construction joint in rigid pavement is provided where
   a) Concreting work is started at the start of the day
   b) Temperature of the concrete is more
   c) Concreting work is stopped at the end of the day
   d) Contraction and expansion is required

3) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods

P.T.O.

4) What is the correct sequence of the following events of construction of a shaft in a rock ?
   1) Drilling and blasting 2) Timbering
   3) Pumping 4) Mucking
   Select the correct answer using the codes given below.
   a) 1, 2, 3, 4 b) 1, 4, 2, 3 c) 2, 1, 4, 3 d) 2, 4, 1, 3
5) PPP stands for
   a) Private Public Partnership b) Public Private Partnership
   c) Partnership Public Private d) Public Provident Partnership
6) Reaction time of a driver
   a) increases with increase in speed
   b) decreases with increase in speed
   c) is same for all speeds
   d) none of the above
7) Bottom most layer of pavement is known as
   a) wearing course b) base course
   c) sub-base course d) subgrade
8) The terrain may be classified as rolling terrain if the cross slope of land is
   a) upto 10% b) between 10% and 25%
   c) between 25% and 60% d) more than 60%
9) Rapid curing cutback bitumen is produced by blending bitumen with
   a) Kerosene b) Petrol c) Diesel d) Benzene
10) For highway geometric design purposes the speed used is
   a) 15^{th} percentile b) 50^{th} percentile
   c) 85^{th} percentile d) 98^{th} percentile
11) For the design of super elevation for mixed traffic conditions, the speed is reduced by
   a) 15% b) 20% c) 25% d) 75%
12) Widening of curve on horizontal curve is required for _____ purpose.
   a) Mechanical b) Psychological
   c) Both a) and b) d) None of these
13) Spacing of the contraction joint is
   a) 4.0 m to 5.0 m b) 5.0 m to 6.0 m
   c) 6.0 m to 7.0 m d) 7.0 m to 8.0 m
14) Equivalent radius of resisting section for 20 cm thick slab, given that the radius of contact area of wheel load is 15 cm is
   a) 15.07 cm b) 14.07 cm c) 16.07 cm d) 17.07 cm

_____

SLR-TX – 50

Seat No.	

T.E. (Civil Engineering) (Part – I) (New-CBCS) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure on r**ight** indicates **full** marks.*
*3) Assume suitable data **wherever** needed and mention it **clearly**.*

SECTION – I

2. Solve **any two** (**7 marks each**) :

a) Calculate the minimum sight distance required to avoid a head-on collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.7 and a brake efficiency of 50 percent, in either case. **7**

b) A two lane national highway passing through a rolling terrain has a horizontal curve of radius 500 m. Design the length of transition curve and shift of the curve. Assume Design speed = 80 kmph, length of wheel base = 6 m, width of pavement = 7 m. Rate of introduction of super eleveation = 1 in 150. **7**

c) Write a detailed note on “Volume and Speed Studies”. **7**

3. Solve **any two** (**7 marks each**) :

a) Enlist different tests carried out on Bituminous material. Explain any one in detail with neat sketch and its practical application. **7**

b) Discuss the importance of Highway Drainage. **7**

c) Write a detailed note on applications of Geosynthetics in road construction. **7**

Set S

SECTION – II

4. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Draw a neat sketch of cross section of two lane flexible pavement and show the component parts. Enumerate the functions and importance of each component of the pavement.

b) Enumerate the construction steps of Cement Concrete pavement.

c) It is proposed to widen the existing two lane National Highway section to 4-lane divided road. Design the pavement for new carriageway using IRC guidelines.

Input data :

1) Initial traffic in each direction on counting year, N = 4000 cv/day
2) Construction period since last traffic count, x = 3 years
3) Design life = 15 years
4) Design CBR of Subgrade soil to be employed, = 8%
5) Traffic Growth Rate, r = 8%
6) Vehicle Damage Factor as per axle load survey, F = 4.0
7) Lane Distribution factor, D = 0.75
8) Directional Distribution = 1.00

Use Plate-4 to 6 of IRC-37-2012.

5. Answer **any two** questions (**7 marks each**) : **(2×7=14)**

a) Calculate the annual cost of a stretch of higway from the following data.

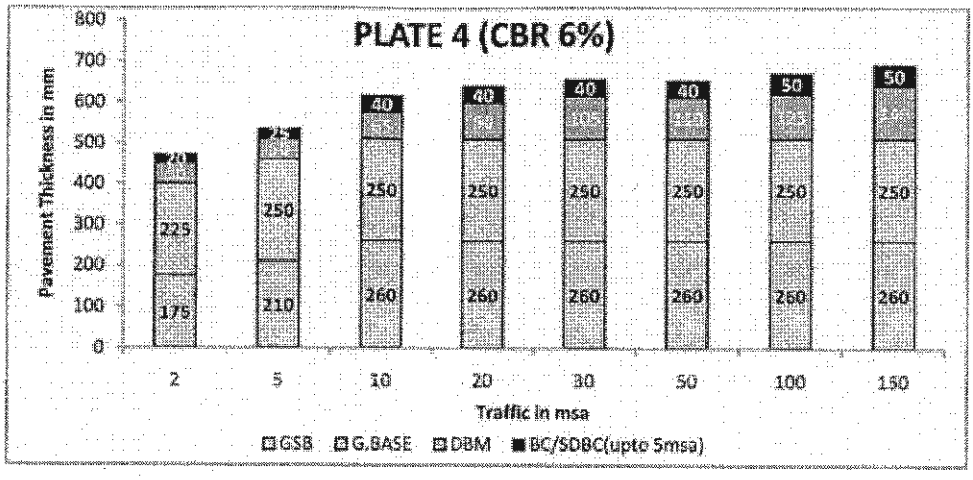
Item	Total Cos, Rs. In Lakhs	Estimated Life, years	Rate of Interest, %
Land	35	100	6
Earth work	40	40	8
Bridges, culverts & Drainage	50	60	8
Pavement	100	15	10
Traffic signs and road appurtenaces	15	5	10

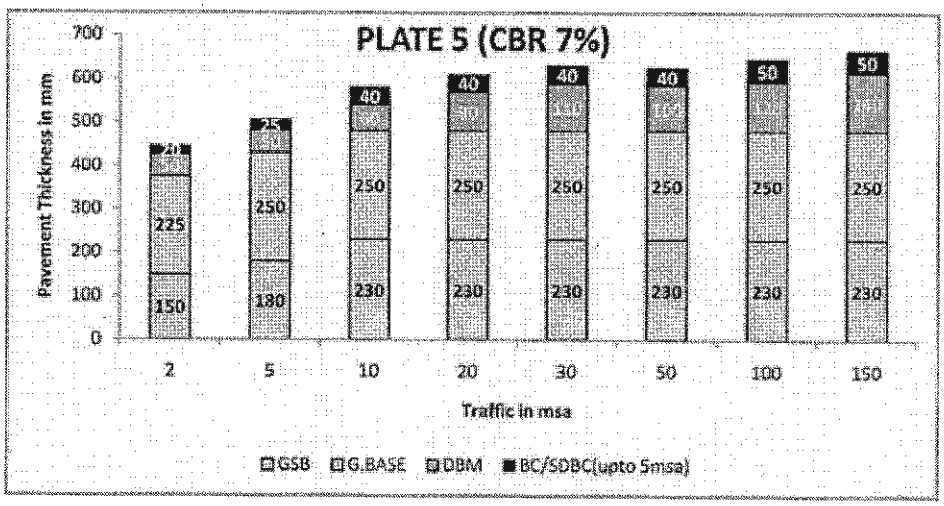
The average cost of maintenance of the road is Rs. 1.5 lakhs per year.

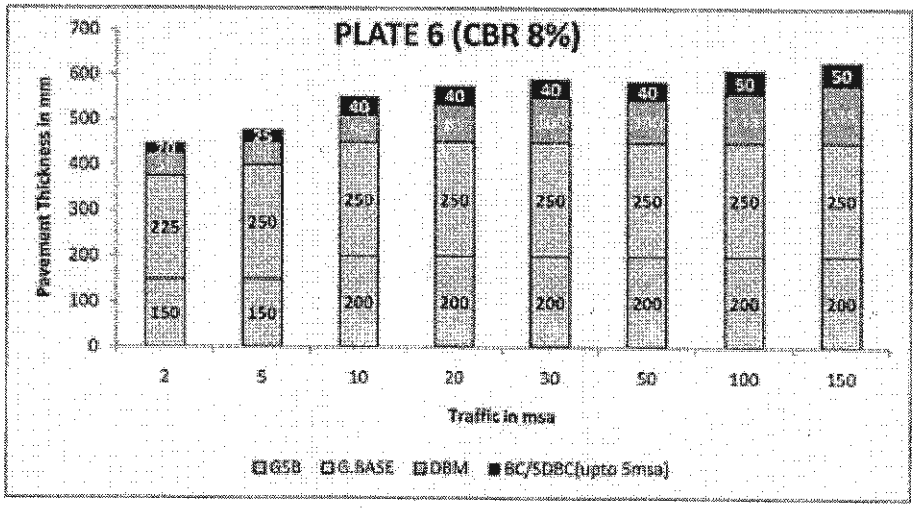
b) What are the advantages of implementing PPP projects for highway development in India ?

c) Describe heading and bench method of tunneling in hard rock with neat sketch.

Set S







SLR-TX – 60

Seat No.	

Set **P**

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume suitable data **wherever** necessary and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Which type of bridge foundation is suitable when rock level close to the ground or top soil strata is strong ?

a) Deep foundations b) Shallow foundations

c) Pile foundation d) Well foundation

2) Consider the following statements,

Excessive camber is not provided on the roads because

1. transverse tile causes discomfort
2. of formation of cross ruts
3. of likely toppling over of highly laden bullock carts
4. of higher cost involved

Which of these statements are correct ?

a) 2, 3 and 4 b) 1, 3 and 4 c) 1, 2 and 4 d) 1, 2 and 3

3) Ruling gradient on highways as per IRC in plain terrain is

a) 1 in 30 b) 1 in 60 c) 1 in 100 d) 1 in 200

4) If the difference in elevation between the edges of a pavement of width 9 m and its crown is 7.5 cm, what is the camber of the pavement ?

a) 1 in 60 b) 1 in 45 c) 1 in 30 d) 1 in 15

5) Bitumen grade 80/100 indicates that under the standard test conditions, penetration value of would vary from

a) 0.8 mm to 1 mm b) 8 mm to 10 mm

c) 8 cm to 10 cm d) 0.08 mm to 0.1 mm

6) In cement concrete pavements, tie bars are installed in

a) Expansion joints b) Contraction joints

c) Warping joints d) Longitudinal joints

P.T.O.

7) Match **List – I** (Item) with **List – II** (Use) and select the correct answer using the codes :

List – I	**List – II**
A) O and D survey	1) Concrete pavement design
B) Collision diagram	2) Compaction
C) OMC	3) Accident survey
D) Radius of relative stiffness	4) Traffic survey

Codes :

	A	**B**	**C**	**D**
a)	3	4	1	2
b)	4	3	2	1
c)	3	4	2	1
d)	4	3	1	2

8) Match **List – I** (Studies) with **List – II** (Purpose) and select the correct answer using the codes :

List – I	**List – II**
A) Economic studies	1) For road location and alignment
B) Financial studies	2) For population and agricultural pattern
C) Traffic studies	3) For ascertaining the source of income
D) Engineering studies	4) For traffic volume and traffic flow patterns

Codes :

	A	**B**	**C**	**D**
a)	1	2	3	4
b)	2	3	4	1
c)	3	4	2	1
d)	1	3	2	4

9) The corrected modulus of subgrade reaction for standard diameter plate is 6kg/cm^3. What would be the modulus of subgrade reaction of the soil when tested with a 30 cm diameter plate ?
   a) 15kg/cm^3 b) 25kg/cm^3 c) 30kg/cm^3 d) 60kg/cm^3

10) Speed regulations on roads is decided on the basis of
   a) 60th percentile cumulative frequency
   b) 75th percentile cumulative frequency
   c) 80th percentile cumulative frequency
   d) 85th percentile cumulative frequency

11) For the construction of Water Bound Macadam (WBM) roads, the correct sequence of operations after spreading coarse aggregates is
   a) Dry rolling, wet rolling, application of screening and application of filler
   b) Dry rolling, application of filler, wet rolling and application of screening
   c) Dry rolling, application of screening, wet rolling, and application of filler
   d) Dry rolling, application of screening, application of filler and wet rolling,

12) Which one of these methods of tunnel construction is not suitable in rocks ?
   a) Full face method b) Compressed air method
   c) Heading and benching method d) Drift method

13) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods

14) Which type of bridge is normally the longest type' ?
   a) Beam b) Arch c) Cable stayed d) Suspension

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Set P

SLR-TX – 60

Seat No.	

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data wherever necessary and mention it **clearly**.*

SECTION – I

2. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain the role of transportation in the development of country and write the different modes of transport.
   b) The area of a certain district is 80000 sq. km and number of towns 86. Calculate the length of different categories of roads to be provided in this district by the year 2001. Overall road density aimed at 82 km per 100 sq.km area.
   c) Define Stopping Sight Distance (SSD) and calculate the stopping sight distance required on sloping gradient of – 2.5% for a design speed of 100 kmph. Assume a reaction time of 2.5 sec, coefficient of friction of 0.7 and brake efficiency of the vehicle is 50%. Also calculate the intermediate sight distance.
   d) Write a short notes on objectives of
      1) Super elevation and curve widening
      2) Transition curves.
3. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) What are the objectives of O and D study ? Enlist the methods of conducting O and D study.
   b) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrain crossing is 12 sec. Design the two phase traffic signal with pedestrain crossing by Webster's method. Sketch the phase diagram.
   c) What are the various tests carried out on bitumen ? Briefly mention the principle and use of each.
   d) Write a short notes on :
      1) Types of parking facilities
      2) Steps in bituminous mix design.

SECTION – II

4. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain 'Flexible Pavement and Rigid Pavement' and bring out the points of difference.
   b) Enumerate the construction steps of Water Bound Macadam (WBM) road.
   c) Calculate the stresses at the interior, edge and corner region of cement concrete pavement using Westergaard's analysis. Use the following data : Wheel Load P = 4100 kg, Modulus of elasticity of cement concrete E = 0.3 million kg/cm^2 pavement thickness, h = 15 cm, Poisson's ratio, μ = 0.15, modulus of subgrade reaction, K = 3.0 kg/cm^3, radius of contact area, a = 15 cm.

Set P

d) Write design steps of CBR method of flexible pavement design as per IRC guidelines. Calculate the CSA for the given data.

1) Type of road-two lane undivided carriageway
2) Design CBR value – 5.0%
3) Initial traffic on completion of construction = 300 cv per day
4) Average growth rate = 6.0% per year
5) Design life = 10 years
6) VDF value = 2.5
7) Lane distribution factor = 0.75.

5. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**

a) What is scour and scour depth ? A bridge is proposed to be constructed across an alluvial stream carrying a discharge of 300 m^3/sec. Assuming the value of silt factor = 1.1, determine the maximum scour depth when the bridge consist of three spans of 30 m each. Assume maximum scour depth = 2 d at noses of piers.

b) Describe drainage in tunneling.

c) State methods of tunneling in soft rock. Explain with sketch any one method.

d) Write short notes on :

1) IRC class AA loading
2) Bridge bearings.

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SLR-TX – 60

Seat No.	

Set Q

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume suitable data **wherever** necessary and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Match **List – I** (Studies) with **List – II** (Purpose) and select the correct answer using the codes :

List – I	List – II
A) Economic studies	1) For road location and alignment
B) Financial studies	2) For population and agricultural pattern
C) Traffic studies	3) For ascertaining the source of income
D) Engineering studies	4) For traffic volume and traffic flow patterns

Codes :

	A	B	C	D
a)	1	2	3	4
b)	2	3	4	1
c)	3	4	2	1
d)	1	3	2	4

2) The corrected modulus of subgrade reaction for standard diameter plate is 6kg/cm^3. What would be the modulus of subgrade reaction of the soil when tested with a 30 cm diameter plate ?
a) 15kg/cm^3 b) 25kg/cm^3 c) 30kg/cm^3 d) 60kg/cm^3

3) Speed regulations on roads is decided on the basis of
a) 60th percentile cumulative frequency
b) 75th percentile cumulative frequency
c) 80th percentile cumulative frequency
d) 85th percentile cumulative frequency

4) For the construction of Water Bound Macadam (WBM) roads, the correct sequence of operations after spreading coarse aggregates is
a) Dry rolling, wet rolling, application of screening and application of filler
b) Dry rolling, application of filler, wet rolling and application of screening
c) Dry rolling, application of screening, wet rolling, and application of filler
d) Dry rolling, application of screening, application of filler and wet rolling,

5) Which one of these methods of tunnel construction is not suitable in rocks ?
a) Full face method b) Compressed air method
c) Heading and benching method d) Drift method

P.T.O.

6) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods

7) Which type of bridge is normally the longest type' ?
   a) Beam b) Arch c) Cable stayed d) Suspension

8) Which type of bridge foundation is suitable when rock level close to the ground or top soil strata is strong ?
   a) Deep foundations b) Shallow foundations
   c) Pile foundation d) Well foundation

9) Consider the following statements,
   Excessive camber is not provided on the roads because
   1. transverse tile causes discomfort
   2. of formation of cross ruts
   3. of likely toppling over of highly laden bullock carts
   4. of higher cost involved

   Which of these statements are correct ?
   a) 2, 3 and 4 b) 1, 3 and 4 c) 1, 2 and 4 d) 1, 2 and 3

10) Ruling gradient on highways as per IRC in plain terrain is
   a) 1 in 30 b) 1 in 60 c) 1 in 100 d) 1 in 200

11) If the difference in elevation between the edges of a pavement of width 9 m and its crown is 7.5 cm, what is the camber of the pavement ?
   a) 1 in 60 b) 1 in 45 c) 1 in 30 d) 1 in 15

12) Bitumen grade 80/100 indicates that under the standard test conditions, penetration value of would vary from
   a) 0.8 mm to 1 mm b) 8 mm to 10 mm
   c) 8 cm to 10 cm d) 0.08 mm to 0.1 mm

13) In cement concrete pavements, tie bars are installed in
   a) Expansion joints b) Contraction joints
   c) Warping joints d) Longitudinal joints

14) Match **List – I** (Item) with **List – II** (Use) and select the correct answer using the codes :

List – I	**List – II**
A) O and D survey	1) Concrete pavement design
B) Collision diagram	2) Compaction
C) OMC	3) Accident survey
D) Radius of relative stiffness	4) Traffic survey

Codes :

	A	**B**	**C**	**D**
a)	3	4	1	2
b)	4	3	2	1
c)	3	4	2	1
d)	4	3	1	2

Set Q

SLR-TX – 60

Seat No.	

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data wherever necessary and mention it **clearly**.*

SECTION – I

2. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain the role of transportation in the development of country and write the different modes of transport.
   b) The area of a certain district is 80000 sq. km and number of towns 86. Calculate the length of different categories of roads to be provided in this district by the year 2001. Overall road density aimed at 82 km per 100 sq.km area.
   c) Define Stopping Sight Distance (SSD) and calculate the stopping sight distance required on sloping gradient of – 2.5% for a design speed of 100 kmph. Assume a reaction time of 2.5 sec, coefficient of friction of 0.7 and brake efficiency of the vehicle is 50%. Also calculate the intermediate sight distance.
   d) Write a short notes on objectives of
      1) Super elevation and curve widening
      2) Transition curves.
3. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) What are the objectives of O and D study ? Enlist the methods of conducting O and D study.
   b) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrain crossing is 12 sec. Design the two phase traffic signal with pedestrain crossing by Webster's method. Sketch the phase diagram.
   c) What are the various tests carried out on bitumen ? Briefly mention the principle and use of each.
   d) Write a short notes on :
      1) Types of parking facilities
      2) Steps in bituminous mix design.

SECTION – II

4. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain 'Flexible Pavement and Rigid Pavement' and bring out the points of difference.
   b) Enumerate the construction steps of Water Bound Macadam (WBM) road.
   c) Calculate the stresses at the interior, edge and corner region of cement concrete pavement using Westergaard's analysis. Use the following data : Wheel Load P = 4100 kg, Modulus of elasticity of cement concrete E = 0.3 million kg/cm^2 pavement thickness, h = 15 cm, Poisson's ratio, μ = 0.15, modulus of subgrade reaction, K = 3.0 kg/cm^3, radius of contact area, a = 15 cm.

Set Q

d) Write design steps of CBR method of flexible pavement design as per IRC guidelines. Calculate the CSA for the given data.

1) Type of road-two lane undivided carriageway
2) Design CBR value – 5.0%
3) Initial traffic on completion of construction = 300 cv per day
4) Average growth rate = 6.0% per year
5) Design life = 10 years
6) VDF value = 2.5
7) Lane distribution factor = 0.75.

5. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**

a) What is scour and scour depth ? A bridge is proposed to be constructed across an alluvial stream carrying a discharge of 300 m^3/sec. Assuming the value of silt factor = 1.1, determine the maximum scour depth when the bridge consist of three spans of 30 m each. Assume maximum scour depth = 2 d at noses of piers.

b) Describe drainage in tunneling.

c) State methods of tunneling in soft rock. Explain with sketch any one method.

d) Write short notes on :

1) IRC class AA loading
2) Bridge bearings.

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SLR-TX – 60

Seat No.	

Set R

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume suitable data **wherever** necessary and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Bitumen grade 80/100 indicates that under the standard test conditions, penetration value of would vary from
   a) 0.8 mm to 1 mm b) 8 mm to 10 mm
   c) 8 cm to 10 cm d) 0.08 mm to 0.1 mm

2) In cement concrete pavements, tie bars are installed in
   a) Expansion joints b) Contraction joints
   c) Warping joints d) Longitudinal joints

3) Match **List – I** (Item) with **List – II** (Use) and select the correct answer using the codes :

List – I	**List – II**
A) O and D survey	1) Concrete pavement design
B) Collision diagram	2) Compaction
C) OMC	3) Accident survey
D) Radius of relative stiffness	4) Traffic survey

Codes :

	A	**B**	**C**	**D**
a)	3	4	1	2
b)	4	3	2	1
c)	3	4	2	1
d)	4	3	1	2

4) Match **List – I** (Studies) with **List – II** (Purpose) and select the correct answer using the codes :

List – I	**List – II**
A) Economic studies	1) For road location and alignment
B) Financial studies	2) For population and agricultural pattern
C) Traffic studies	3) For ascertaining the source of income
D) Engineering studies	4) For traffic volume and traffic flow patterns

Codes :

	A	**B**	**C**	**D**
a)	1	2	3	4
b)	2	3	4	1
c)	3	4	2	1
d)	1	3	2	4

P.T.O.

5) The corrected modulus of subgrade reaction for standard diameter plate is 6kg/cm^3. What would be the modulus of subgrade reaction of the soil when tested with a 30 cm diameter plate ?
   a) 15kg/cm^3 b) 25kg/cm^3 c) 30kg/cm^3 d) 60kg/cm^3
6) Speed regulations on roads is decided on the basis of
   a) 60th percentile cumulative frequency
   b) 75th percentile cumulative frequency
   c) 80th percentile cumulative frequency
   d) 85th percentile cumulative frequency
7) For the construction of Water Bound Macadam (WBM) roads, the correct sequence of operations after spreading coarse aggregates is
   a) Dry rolling, wet rolling, application of screening and application of filler
   b) Dry rolling, application of filler, wet rolling and application of screening
   c) Dry rolling, application of screening, wet rolling, and application of filler
   d) Dry rolling, application of screening, application of filler and wet rolling,
8) Which one of these methods of tunnel construction is not suitable in rocks ?
   a) Full face method b) Compressed air method
   c) Heading and benching method d) Drift method
9) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods
10) Which type of bridge is normally the longest type' ?
   a) Beam b) Arch c) Cable stayed d) Suspension
11) Which type of bridge foundation is suitable when rock level close to the ground or top soil strata is strong ?
   a) Deep foundations b) Shallow foundations
   c) Pile foundation d) Well foundation
12) Consider the following statements,
   Excessive camber is not provided on the roads because
   1. transverse tile causes discomfort
   2. of formation of cross ruts
   3. of likely toppling over of highly laden bullock carts
   4. of higher cost involved

   Which of these statements are correct ?
   a) 2, 3 and 4 b) 1, 3 and 4 c) 1, 2 and 4 d) 1, 2 and 3
13) Ruling gradient on highways as per IRC in plain terrain is
   a) 1 in 30 b) 1 in 60 c) 1 in 100 d) 1 in 200
14) If the difference in elevation between the edges of a pavement of width 9 m and its crown is 7.5 cm, what is the camber of the pavement ?
   a) 1 in 60 b) 1 in 45 c) 1 in 30 d) 1 in 15

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SLR-TX – 60

Seat No.	

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data wherever necessary and mention it **clearly**.*

SECTION – I

2. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain the role of transportation in the development of country and write the different modes of transport.
   b) The area of a certain district is 80000 sq. km and number of towns 86. Calculate the length of different categories of roads to be provided in this district by the year 2001. Overall road density aimed at 82 km per 100 sq.km area.
   c) Define Stopping Sight Distance (SSD) and calculate the stopping sight distance required on sloping gradient of – 2.5% for a design speed of 100 kmph. Assume a reaction time of 2.5 sec, coefficient of friction of 0.7 and brake efficiency of the vehicle is 50%. Also calculate the intermediate sight distance.
   d) Write a short notes on objectives of
      1) Super elevation and curve widening
      2) Transition curves.
3. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) What are the objectives of O and D study ? Enlist the methods of conducting O and D study.
   b) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrain crossing is 12 sec. Design the two phase traffic signal with pedestrain crossing by Webster's method. Sketch the phase diagram.
   c) What are the various tests carried out on bitumen ? Briefly mention the principle and use of each.
   d) Write a short notes on :
      1) Types of parking facilities
      2) Steps in bituminous mix design.

SECTION – II

4. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain 'Flexible Pavement and Rigid Pavement' and bring out the points of difference.
   b) Enumerate the construction steps of Water Bound Macadam (WBM) road.
   c) Calculate the stresses at the interior, edge and corner region of cement concrete pavement using Westergaard's analysis. Use the following data : Wheel Load P = 4100 kg, Modulus of elasticity of cement concrete E = 0.3 million kg/cm^2 pavement thickness, h = 15 cm, Poisson's ratio, μ = 0.15, modulus of subgrade reaction, K = 3.0 kg/cm^3, radius of contact area, a = 15 cm.

Set R

d) Write design steps of CBR method of flexible pavement design as per IRC guidelines. Calculate the CSA for the given data.

1) Type of road-two lane undivided carriageway
2) Design CBR value – 5.0%
3) Initial traffic on completion of construction = 300 cv per day
4) Average growth rate = 6.0% per year
5) Design life = 10 years
6) VDF value = 2.5
7) Lane distribution factor = 0.75.

5. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**

a) What is scour and scour depth ? A bridge is proposed to be constructed across an alluvial stream carrying a discharge of 300 m^3/sec. Assuming the value of silt factor = 1.1, determine the maximum scour depth when the bridge consist of three spans of 30 m each. Assume maximum scour depth = 2 d at noses of piers.

b) Describe drainage in tunneling.

c) State methods of tunneling in soft rock. Explain with sketch any one method.

d) Write short notes on :

1) IRC class AA loading
2) Bridge bearings.

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SLR-TX – 60

Seat No.	

Set **S**

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

*3) Figure on **right** indicates **full** marks.*

*4) Assume suitable data **wherever** necessary and mention it **clearly**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Speed regulations on roads is decided on the basis of
   a) 60^{th} percentile cumulative frequency
   b) 75^{th} percentile cumulative frequency
   c) 80^{th} percentile cumulative frequency
   d) 85^{th} percentile cumulative frequency

2) For the construction of Water Bound Macadam (WBM) roads, the correct sequence of operations after spreading coarse aggregates is
   a) Dry rolling, wet rolling, application of screening and application of filler
   b) Dry rolling, application of filler, wet rolling and application of screening
   c) Dry rolling, application of screening, wet rolling, and application of filler
   d) Dry rolling, application of screening, application of filler and wet rolling,

3) Which one of these methods of tunnel construction is not suitable in rocks ?
   a) Full face method b) Compressed air method
   c) Heading and benching method d) Drift method

4) Which one of the following methods is generally considered the best for tunnel ventilation ?
   a) Driving a drift through the tunnel
   b) 'Blowin' method
   c) 'Blowout' method
   d) Combination of 'Blowin' and 'Blowout' methods

5) Which type of bridge is normally the longest type' ?
   a) Beam b) Arch c) Cable stayed d) Suspension

6) Which type of bridge foundation is suitable when rock level close to the ground or top soil strata is strong ?
   a) Deep foundations b) Shallow foundations
   c) Pile foundation d) Well foundation

P.T.O.

7) Consider the following statements,
Excessive camber is not provided on the roads because
1. transverse tile causes discomfort
2. of formation of cross ruts
3. of likely toppling over of highly laden bullock carts
4. of higher cost involved

Which of these statements are correct ?
a) 2, 3 and 4 b) 1, 3 and 4 c) 1, 2 and 4 d) 1, 2 and 3

8) Ruling gradient on highways as per IRC in plain terrain is
a) 1 in 30 b) 1 in 60 c) 1 in 100 d) 1 in 200

9) If the difference in elevation between the edges of a pavement of width 9 m and its crown is 7.5 cm, what is the camber of the pavement ?
a) 1 in 60 b) 1 in 45 c) 1 in 30 d) 1 in 15

10) Bitumen grade 80/100 indicates that under the standard test conditions, penetration value of would vary from
a) 0.8 mm to 1 mm b) 8 mm to 10 mm
c) 8 cm to 10 cm d) 0.08 mm to 0.1 mm

11) In cement concrete pavements, tie bars are installed in
a) Expansion joints b) Contraction joints
c) Warping joints d) Longitudinal joints

12) Match **List – I** (Item) with **List – II** (Use) and select the correct answer using the codes :

List – I	**List – II**
A) O and D survey	1) Concrete pavement design
B) Collision diagram	2) Compaction
C) OMC	3) Accident survey
D) Radius of relative stiffness	4) Traffic survey

Codes :

	A	**B**	**C**	**D**
a)	3	4	1	2
b)	4	3	2	1
c)	3	4	2	1
d)	4	3	1	2

13) Match **List – I** (Studies) with **List – II** (Purpose) and select the correct answer using the codes :

List – I	**List – II**
A) Economic studies	1) For road location and alignment
B) Financial studies	2) For population and agricultural pattern
C) Traffic studies	3) For ascertaining the source of income
D) Engineering studies	4) For traffic volume and traffic flow patterns

Codes :

	A	**B**	**C**	**D**
a)	1	2	3	4
b)	2	3	4	1
c)	3	4	2	1
d)	1	3	2	4

14) The corrected modulus of subgrade reaction for standard diameter plate is 6kg/cm^3. What would be the modulus of subgrade reaction of the soil when tested with a 30 cm diameter plate ?
a) 15kg/cm^3 b) 25kg/cm^3 c) 30kg/cm^3 d) 60kg/cm^3

Set S

SLR-TX – 60

Seat No.	

T.E. (Civil Engineering) (Part – I) (Old-CGPA) Examination, 2018
TRANSPORTATION ENGINEERING – I

Day and Date : Monday, 10-12-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1) Figure on **right** indicates **full** marks.*
*2) Assume suitable data wherever necessary and mention it **clearly**.*

SECTION – I

2. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain the role of transportation in the development of country and write the different modes of transport.
   b) The area of a certain district is 80000 sq. km and number of towns 86. Calculate the length of different categories of roads to be provided in this district by the year 2001. Overall road density aimed at 82 km per 100 sq.km area.
   c) Define Stopping Sight Distance (SSD) and calculate the stopping sight distance required on sloping gradient of – 2.5% for a design speed of 100 kmph. Assume a reaction time of 2.5 sec, coefficient of friction of 0.7 and brake efficiency of the vehicle is 50%. Also calculate the intermediate sight distance.
   d) Write a short notes on objectives of
      1) Super elevation and curve widening
      2) Transition curves.
3. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) What are the objectives of O and D study ? Enlist the methods of conducting O and D study.
   b) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrain crossing is 12 sec. Design the two phase traffic signal with pedestrain crossing by Webster's method. Sketch the phase diagram.
   c) What are the various tests carried out on bitumen ? Briefly mention the principle and use of each.
   d) Write a short notes on :
      1) Types of parking facilities
      2) Steps in bituminous mix design.

SECTION – II

4. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**
   a) Explain 'Flexible Pavement and Rigid Pavement' and bring out the points of difference.
   b) Enumerate the construction steps of Water Bound Macadam (WBM) road.
   c) Calculate the stresses at the interior, edge and corner region of cement concrete pavement using Westergaard's analysis. Use the following data : Wheel Load P = 4100 kg, Modulus of elasticity of cement concrete E = 0.3 million kg/cm^2 pavement thickness, h = 15 cm, Poisson's ratio, μ = 0.15, modulus of subgrade reaction, K = 3.0 kg/cm^3, radius of contact area, a = 15 cm.

Set S

d) Write design steps of CBR method of flexible pavement design as per IRC guidelines. Calculate the CSA for the given data.

1) Type of road-two lane undivided carriageway
2) Design CBR value – 5.0%
3) Initial traffic on completion of construction = 300 cv per day
4) Average growth rate = 6.0% per year
5) Design life = 10 years
6) VDF value = 2.5
7) Lane distribution factor = 0.75.

5. Answer **any two** questions (**7** marks **each**) : **(2×7=14)**

a) What is scour and scour depth ? A bridge is proposed to be constructed across an alluvial stream carrying a discharge of 300 m^3/sec. Assuming the value of silt factor = 1.1, determine the maximum scour depth when the bridge consist of three spans of 30 m each. Assume maximum scour depth = 2 d at noses of piers.

b) Describe drainage in tunneling.

c) State methods of tunneling in soft rock. Explain with sketch any one method.

d) Write short notes on :

1) IRC class AA loading
2) Bridge bearings.

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