

OPSC 2019

Odisha Public Service Commission

Civil Engineering

Objective Practice Sets

Highway Engineering

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Highway Development and Planning

- Q.1** Indian Road Congress (I.R.C.) was founded and constituted with its head quarters at New Delhi, in
 (a) 1924 (b) 1927
 (c) 1930 (d) 1934

- Q.2** For administration of the movement of road transport, a Motor Vehicle Act was enacted in
 (a) 1927
 (b) 1934
 (c) 1939
 (d) 1947

- Q.3** The principal road pattern in urban areas are
 (a) gird iron pattern
 (b) grid iron and hexagonal pattern
 (c) radial pattern
 (d) both (b) and (c)

- Q.4** The sequence of four stages of survey in a highway alignment is
 (a) reconnaissance, map study, preliminary survey and detailed survey.
 (b) map study, preliminary survey, reconnaissance and detailed survey.
 (c) map study, reconnaissance, preliminary survey and detailed survey.
 (d) preliminary survey, map study, reconnaissance and detailed survey.

- Q.5** Which one of the following is the chronological sequence in regard to road construction/design development?
 (a) Telford, Tresaguet, C.B.R., Macadam
 (b) Tresaguet, Telford, Macadam, C.B.R.
 (c) Macadam, C.B.R., Tresaguet, Telford
 (d) Tresaguet, Macadam, Telford, C.B.R.

- Q.6** Match **List-I** with **List-II** and select the correct answer by using the codes given below the lists:

List-I

- A. Roman Roads
 B. Tresaguet Roads
 C. Metcalf-Roads
 D. Telford Roads

List-II

1. As per Robert Phillips specifications
 2. Foundation stones of sizes 17 to 22 cm
 3. Cross-slope of 1 in 45 at the surface
 4. Top surface is provided with large stone slabs in lime 10 to 15 cm thick

Codes:

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

- Q.7** Match **List-I** with **List-II** and select the correct answer by using the codes given below the lists:

List-I

- A. Central Road Fund
 B. Indian Road Congress (IRC)
 C. Motor Vehicles Act
 D. Nagpur Road Conference

List-II

1. 1939
 2. 1943
 3. 1934
 4. 1st March, 1929

Codes:

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

- Q.8** Three new roads A, B and C are planned in a district. The data for these roads are given below:

Road	Length (km)	Number of Villages with Population		
		Less than 2000	2000-5000	More than 5000
A	20	8	6	1
B	28	19	8	4
C	12	7	5	2

Assume utility units, for population

< 2000 $\Rightarrow$ 1

< 2000-5000 $\Rightarrow$ 2

> 5000 $\Rightarrow$ 3

The order of priority for these three roads should be

- (a) A, B, C (b) B, C, A
(c) C, A, B (d) C, B, A

Common Data for Q. 9-10

The area of a certain district in India is 15000 sq. km. and there are 10 towns in the district.

- Q.9** According to Lucknow Road Plan, what will be length of NH and SH respectively?

- (a) 200 km and 325 km
(b) 300 km and 325 km
(c) 300 km and 600 km
(d) None of these

- Q.10** What will be the total length of Rural Roads (Tertiary system)?

- (a) 12900 km (b) 13200 km
(c) 11900 km (d) 12800 km

- Q.11** In 1927, Jayakar committee was set up to examine and report on road development in India, based on which certain institutions were subsequently set up. Which of the following were the direct out come of Jayakar committee recommendations?

1. Indian Road Congress
2. Central Road Fund

3. CRR

4. National Highway Act

- (a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1, 3 and 4 (d) All the above

- Q.12** Consider

1. Creation of Central Road Fund
2. National Highway Act
3. Formation of Indian Road Congress
4. Creation of Highway Research Board

The correct chronological order of these events is

- (a) 4, 3, 2, 1 (b) 2, 1, 3, 4
(c) 1, 3, 2, 4 (d) 2, 3, 1, 4

- Q.13** The semiofficial body set up for controlling and standardization of roads and bridges in India is

- (a) Highway Research
(b) National Highways Act Committee
(c) Central Road Fund
(d) Indian Road congress

- Q.14** Nagpur road plan has recommended the use of road pattern type of

- (a) star and circular pattern
(b) star and block pattern
(c) star and grid pattern
(d) star and hexagonal pattern

- Q.15** Select the correct statement.

- (a) Nagpur road plan formulae take into account the towns with very large population.
(b) Nagpur road plan has a target road length of 32 km per 100 square km.
(c) Second 20 year plan has provided 1600 km of expressways out of the proposed National highway.
(d) Second 20 year plan allowed deduction of length of railway track in the area while calculating the length of roads.

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Answers Highway Development and Planning

1. (d) 2. (c) 3. (d) 4. (c) 5. (b) 6. (b) 7. (a) 8. (d) 9. (c) 10. (a)
11. (a) 12. (c) 13. (d) 14. (c) 15. (c)

Explanations Highway Development and Planning

2. (c)
Motor vehicle act enacted in 1939, which replaced the first such act, 1914. It has been revised in 1988
4. (c)
(i) Map study - topographic map is used to suggest likely routes of the road.
(ii) Reconnaissance - it is rapid and rough survey. During survey, physical characteristics of the area are inspected and the proposed route is thoroughly examined.
(iii) Preliminary survey - it consists of detailed survey of alternative routes selected using chain compass, tape, level and theodolite.
(iv) Final location and detailed survey - the alignment finalized is to be first located on the field.
8. (d)
Assuming utility units, for population
 $\begin{aligned} < 2000 &= 1.0 \\ < 2000 - 5000 &= 2.0 \\ > 5000 &= 3.0 \end{aligned}$
 Utility per unit length,
 For load

$$A = \frac{8 \times 1.0 + 6 \times 2 + 1 \times 3}{20} = 1.150 \quad \dots(iii)$$

 For load

$$B = \frac{19 \times 1.0 + 8 \times 2.0 + 4 \times 3}{28} = 1.679 \quad \dots(ii)$$

 For load

$$C = \frac{7 \times 1.0 + 5 \times 2.0 + 2 \times 3.0}{12} = 1.92 \quad \dots(i)$$
9. (c)

$$\text{Length of NH, km} = \frac{15000}{50} = 300 \text{ km}$$

$$\text{Length of SH, km} = \frac{15000}{25} = 600 \text{ km} \quad \dots(i)$$

 Also length of SH, km = $62.5 \times 10 - \frac{15000}{50}$

$$= 325 \text{ km}$$

 By total no. of towns and area in the state adopt length of SH (higher of the two) = 600 km
10. (a)

$$\text{NH} + \text{SH} + \text{MDR} + \text{ODR} + \text{VR} = 15000 \text{ km}$$

$$\left. \begin{aligned} \text{Length of MDR} &= \frac{15000}{12.5} = 1200 \text{ km} \\ \text{or} &= 90 \times 10 = 900 \text{ km} \end{aligned} \right\}$$

 By no. of towns in the state,
 adopt 1200 km

$$\text{NH} + \text{SH} + \text{MDR} = 300 + 600 + 1200 \text{ km}$$

$$= 2100 \text{ m}$$

 Tertiary system or Rural Roads consists of ODR and VR.

$$\therefore \text{Length of Rural Road} = 15000 - (2100)$$

$$= 12900 \text{ km}$$
15. (c)
 Nagpur road plan (1943-1963) laid down target for density of road network of 16 km per 100 sq km in the country at the end of 20 years road network in year 1963.

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