

U218-113(T1)

Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF INFORMATION TECHNOLOGY, PUNE-48
Department of Civil Engineering

S. Y. B. Tech. Civil Engineering (2017 Pattern), Sem.-I: In-Sem. Exam. (T1), October 2018

Infrastructure Engineering (Course Code: CVUA21173)

Solution, Model Answers and Scheme of Marking

#####

Q.1 (a) 3 advantages & 3 drawbacks of PPP w.r.t. Infra. Dev.: 1 mark each. [Total 6 marks]

Advantages: Raising the funds for projects becomes easier, Execution/ feasibility of projects possible, Simultaneous completion of projects possible, Private parties invest & maintain the projects, Projects can be undertaken by different agencies/ parties, etc.

Drawbacks/ Disadvantages: Practically the Govt. has less control on the projects, Poor R & M, People have to pay more (tax/ toll), Coordination/ cooperation problems if many agencies involved.

(b) 1.5 marks each for comparison roadways, railways and waterways with respect to Cost of transport, Time of transport, Suitability in hilly regions and Accessibility. [Total 6 marks]

Comparison Point	Roadways	Railways	Waterways
Cost of transport	Highest	Moderate	Lowest
Time of transport	Moderate	Minimum	Maximum
Suitability in hilly regions	Most suitable	Not suitable	Not possible
Accessibility	From any location to any location	Only at Rly. Stn.	At port or harbor only

(c) 2 marks each for brief expl. of pros and cons of BRTS for Indian Cities/ Towns. [Total 4 marks]

- Travel time reduced, more disciplined traffic, more comfortable journey, more safety in travel, saving of the fossil fuel, less pollution, Impetus to innovations/ R & D, Aesthetics.
- Cost of travel may increase, Special/ separate lanes necessary, Success depends on public attitude and response, Efficiency depends proper operation of the whole system, Road width is already less (which may lead to non-uniform lane width for BRTS), More dependency on electronics and computerized systems.

OR

Q.2 (a) Proper justification of the statement: Economic growth of an area primarily depends on network and efficiency of roadways and railway. [Total 6 marks]

- After water and power; connectivity is the most important requirement for development of a locality/ of an area. Economic growth primarily depends on production & distribution of goods. Availability of raw materials and labor are the crucial factors for production. If not locally available, rapid and safe means of transportation are essential. Most convenient & efficient transportation modes are road & rail ways.
- In addition, following points are relevant for
 - 1) Enhancement of overall economy and improves sectoral growth/ development,
 - 2) Rapid rural development,
 - 3) More job opportunities/ employment generation and boost to entrepreneurship,
 - 4) Overall balanced development of a region,
 - 5) Quick access and reducing travel time,
 - 6) Distribution of resources, services, amenities and facilities on fairly equitable basis,
 - 7) Better (improved) health care, education and living conditions for people.

(b) 1 mark each for three advantages of Infrastructure Development in the National context and three advantages in Global context. [Total 6 marks]

- Points are relevant in the National Context
 - 1) Enhancement of overall economy and improves sectoral growth/ development,
 - 2) Rapid rural development,
 - 3) More job opportunities/ employment generation and boost to entrepreneurship,
 - 4) Overall balanced development of a region,
 - 5) Quick access and reducing travel time,
 - 6) Distribution of resources, services, amenities and facilities on fairly equitable basis,
 - 7) Better (improved) health care, education and living conditions for people.
- Points are relevant in the Global Context
 - 1) Better connectivity with the World,

Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF INFORMATION TECHNOLOGY, PUNE-48
Department of Civil Engineering

- 2) Impetus to Import-Export,
- 3) Possible increase in foreign exchange reserves,
- 4) Attracting more FDI,
- 5) More job opportunities/ employment in relevant fields,
- 6) More cultural exchange,
- 7) Strategic and Political advantages through more MoUs.

(c) Meaning of 'smart city' 1 mark, 1 mark each explanation of any three essential/ important features of a smart city. [Total 4 marks]

- Smart City means a city with better (Improved) living conditions including safety and disaster management systems, assured quality and quantity of power supply, adequate water supply and drainage system, efficient waste management systems, improved health care and educational facilities, more open spaces (parks, play-grounds), efficient transportation and traffic management.
- Features of Smart City:
 - 1) Mixed land use in area-based development: planning for the convenience of people.
 - 2) Better housing for all sections of the society
 - 3) Providing a variety of transportation options to the people
 - 4) Preserving and developing open spaces/ gardens/ parks/ playgrounds
 - 5) BRTS and ITS
 - 6) E-Governance, etc.

Q.3 (a) 1 mark each for 3 requirements of: Good sleepers & Good ballast. [Total 6 marks]

Sleepers: Sufficient strength, less noisy, better shock absorbing quality, better durability, ease of fixing and working, non-tampering, safety against sabotage/ theft, good fire resistance, less initial cost, ease of repairs/ maintenance and less R & M cost.

Ballast: Adequate strength, durability, better shock absorbing quality, proper size/ well graded, better drainage quality, less initial cost, less maintenance and less R & M cost.

(b) Note on 'Metro Rail': General description with types & examples 2 marks, two advantages & two drawbacks 2 marks. [Total 4 marks]

- Metro rail is a Rapid Mass Transit System (RMTS), also known as subway, tube, underground railway.
- It is a high-capacity public transport more suitable for Cities and Towns (Metros)
- Like other advanced rapid transit systems, metro rails are driven by electric motors. Like conventional railways, vehicle bodies can be connected to the beam via bogies, allowing curves to be negotiated.
- **Advantages:** Less space requirement, good carrying capacity, fast travel, no traffic problems, less accidents, less pollution (air and noise), comfortable & joyful journey.
- **Disadvantages:** Problems for passengers in case of emergency/ disaster, more time of construction, high initial cost, special technology required, repairs and maintenance are frequent and difficult.

(c) All components of permanent way 2 marks, neat labelled sketch 2 marks. [Total 4 marks]

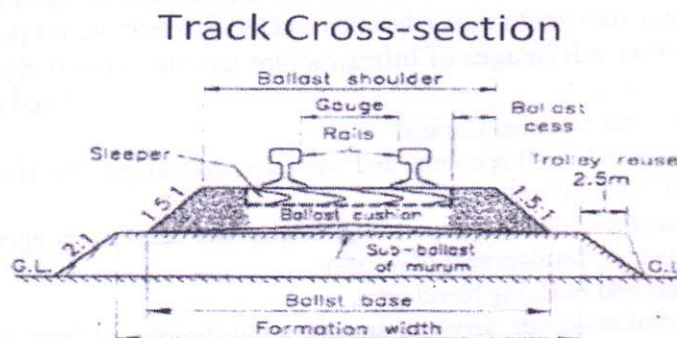


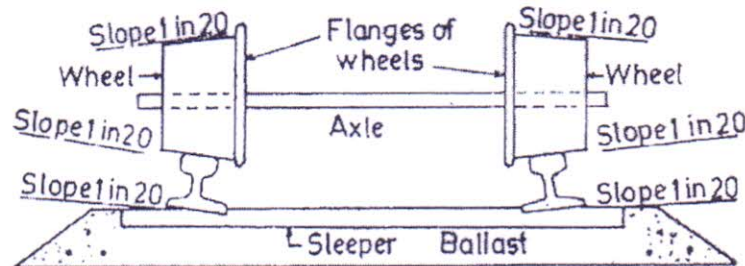
Fig. 3.1 Typical Cross-section of a Permanent Way on Embankment.

Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF INFORMATION TECHNOLOGY, PUNE-48
Department of Civil Engineering

OR

Q.4 (a) Sketch/ sketches 3 marks, explanation 3 marks: (i) coning of wheels, and (ii) Tilting of rails.

[Total 6 marks]



(b) Note on Mono Rail: General description with types & examples 2 marks, two advantages & two drawbacks 2 marks. [Total 4 marks]

- Railway with a 0.6 to 0.9 wide beam or single track that is separated from other traffic and pedestrians
- Track is generally suspended, but can be on the ground or below grade or in subway tunnels
- Monorail vehicles are wider than the guide way that supports them
- Generally for passengers and more suitable for airport transport
- There can be individual rigid vehicles, articulated single units, or multiple units coupled into trains. Like other advanced rapid transit systems, monorails can be driven by linear induction motors; like conventional railways, vehicle bodies can be connected to the beam via bogies, allowing curves to be negotiated.
- **Advantages:** Minimum space requirement, fast travel, no traffic problems, less accidents, less pollution (air and noise), travel on steeper gradients possible, comfortable & joyful journey.
- **Disadvantages:** Problems for passengers in case of emergency/ disaster, high initial & running cost, less capacity, special technology required, repairs and maintenance are frequent and difficult.


(c) 1 mark each for stating and briefly explaining four functions of rails. [Total 4 marks]

Brief explanation of any 4 functions of rails:

- (1) To provide a hard, continuous level surface for traveling of trains
- (2) To minimize the frictional resistance
- (3) To transfer the loads on wider area of the track through sleepers and reduce the pressure on the ballast and formation
- (4) To provide adequate base, strength and safety to withstand dead and live loads
- (5) To ensure sufficient lateral support and stiffness to the track
- (6) To ensure desired stability and durability of the track
- (7) To absorb vibrations and shocks to some extent
- (8) To bear direct (compressive & tensile), bending, twisting and thermal stresses safely

#####

Any other relevant and correct point explained/ figure drawn shall be given due weightage depending the accuracy.


23/9/2018
(Prof. S. P. Nitsure)
Course Coordinator