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Cv-604/R&TE/6th Sem/2018/J/A

## RAILWAY AND TUNNEL ENGINEERING

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10
- (a) The clear distance between the running faces of two track rails is called \_\_\_\_\_.
- (b) On curved tracks, super elevation is maintained by \_\_\_\_\_ and formation is levelled.
- (c) Creep is the \_\_\_\_\_ movement of rails.
- (d) Staggered joints are generally provided on \_\_\_\_\_, where the length of outer curve is more than the length of inner curve.

[Turn over

- (e) Wooden sleepers are \_\_\_\_\_ for all types of ballast.
- (f) Ballast transfers the load from the sleeper to the \_\_\_\_\_.
- (g) Spikes are used for holding rails to the \_\_\_\_\_ sleepers.
- (h) Fish plate is a type of \_\_\_\_\_.
- (i) The superelevation is provided to introduce \_\_\_\_\_ to counteract the tendency of the centrifugal force.
- (j) Indian Railway have adopted the values of grade compensation on curves on B.G. as \_\_\_\_\_ per degree of curve.

2. Choose the correct answer from the following alternatives :  $1 \times 10 = 10$

- (a) In India the width of metre gauge is
- (i) 1.676m
  - (ii) 1.0m
  - (iii) 0.762m
  - (iv) 0.610m

- (b) The rail whose head and foot have the same dimension is known as
- (i) Dumb bell rail
  - (ii) Bull head rail
  - (iii) Flat footed rail
  - (iv) None of the above
- (c) The rails are made up of
- (i) cast iron
  - (ii) mild steel
  - (iii) high carbon steel
  - (iv) high speed steel
- (d) The rail is designated by its
- (i) weight
  - (ii) length
  - (iii) weight/unit length
  - (iv) cross-section

(e) Number of fish bolts per fish plate is

(i) 2

(ii) 4

(iii) 6

(v) 8

(f) Standard size of wooden sleeper for B.G. track is

(i)  $274 \times 25 \times 13 \text{cm}$

(ii)  $183 \times 20 \times 11 \text{cm}$

(iii)  $152 \times 15 \times 10 \text{cm}$

(iv)  $250 \times 26 \times 12 \text{cm}$

(g) CST-9 is type of

(i) Steel sleeper

(ii) Cast-iron sleeper

(iii) Wooden sleeper

(iv) Concrete sleeper

- (h) The width of ballast across a B.G. is
- (i) 1.83m
  - (ii) 2.0m
  - (iii) 2.25m
  - (iv) 3.35m
- (i) The quantity of ballast required per metre length of B.G. track is
- (i) zero
  - (ii) 1 in 500
  - (iii) 1 in 750
  - (iv) 1 in 1000
- (j) The arrangement made to divert the train from one track to another is known as
- (i) Railway crossing
  - (ii) Railway junction
  - (iii) Turn out
  - (iv) None of the above.

3. Define the following :

1×5=5

- (a) Hogged Rail
- (b) Sleeper density
- (c) Station
- (d) Signaling
- (e) Permanent way

PART – B

Marks – 45

Answer any *five* questions.

- 4. What is ballast ? What are the requirements of good ballast ? What are the different types of ballast used on Indian Railways ? 1+5+3=9
- 5. What is creep ? What are the possible causes of creep ? What are the effects of it and how it can be prevented ? 1+3+5=9
- 6. What is sleeper ? Discuss the different types of sleeper used in Indian railways and write the advantages and disadvantages of each type. 1+2+6=9

7. Discuss the different types of rail joints with the help of neat sketches and give their merits and limitations.

4+5=9

8. Define points and crossing. What are the functions of points and crossing? Draw a neat sketch of a railway crossing showing its various components.

2+3+4=9

9. Define a tunnel. What are the different types of tunnels? Why tunnel lining is necessary and what are the materials used for tunnel lining?

1+3+3+2=9