

KERALA PUBLIC SERVICE COMMISSION
OVERSEER GRADE I, II & III



CIVIL ENGINEERING
TOPIC-WISE OBJECTIVE SOLVED QUESTIONS

**2005 – 2022 PREVIOUS YEAR QUESTION PAPERS
WITH DETAILED SOLUTIONS**

Useful for Overseer Gr. I, II & III, Junior Instructor,
Vocational Instructor, Junior Technical Officer,
Engineering Assistant, Work Superintendent,
Tracer, Surveyor, Field Assistant,
Tradesman, SSC JE, RRB JEE Examinations

WE4CIVIL
THE CIVIL ENGINEERING ACADEMY

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TABLE OF CONTENTS

S T E N E C O N T E N T S

BUILDING MATERIALS & CONSTRUCTION

1. Brick & Brick Masonry : 12
2. Stone & Stone Masonry : 47
3. Cement : 70
4. Lime : 92
5. Aggregates : 99
6. Concrete : 106
7. Metals and Alloys : 131
8. Paint : 144
9. Timber & Wood Based Products : 154
10. Foundation : 171
11. Arches & Lintels : 186
12. Doors and Windows : 197
13. Stair, Ramp & Escalators : 212
14. Roof & Roofings : 224
15. Floor and Floorings : 240
16. Scaffolding, Shoring & Underpinning : 244
17. Carpentry and Joinery : 250
18. Plastering & Pointing : 259
19. Damp Proof Course : 265
20. Modern Building Materials : 268

ENGINEERING MECHANICS		REINFORCED CEMENT CONCRETE	
1. Force	: 273	1. Concrete Technology & Construction	: 428
2. Friction	: 288	2. Basics of R.C.C. Design	: 441
3. Centroid & Centre of Gravity	: 292	3. Beams	: 451
4. Moment of Inertia	: 297	4. Slabs	: 464
5. Dynamics	: 302	5. Walls, Columns & Footings	: 471
6. Work, Power & Energy	: 312	6. Shear, Bond & Development Length	: 479
7. Levers	: 316	7. Prestressed Concrete	: 484
8. Lifting Machines	: 319	8. Miscellaneous	: 486
9. Optics	: 321		
STRENGTH OF MATERIALS		DESIGN OF STEEL STRUCTURES	
1. Properties of Materials	: 324	1. Structural Fasteners	: 490
2. Stress & Strain	: 333	2. Beams	: 494
3. Bending Moment & Shear Force	: 354	3. Tension Members	: 495
4. Theory of Simple Bending	: 366	4. Compression Members	: 496
5. Shear Stress Distribution in Beams	: 374	5. Plate Girder	: 499
6. Torsion	: 378	6. Plastic Analysis	: 501
7. Slope & Deflection	: 382	7. Miscellaneous	: 503
8. Theory of Thin & Thick Cylinders	: 390		
9. Theory of Columns	: 394		
10. Strain Energy	: 399		
11. Theories of Failure	: 403		
12. Spring	: 404		
13. Propped & Fixed Beams	: 406		
14. Miscellaneous	: 409		
STRUCTURAL ANALYSIS		ESTIMATION & COSTING	
1. Determinacy of Structures	: 412	1 Estimation & Costing & Valuation	: 505
2. Methods of Structural Analysis	: 416		
3. Analysis of Beams	: 417		
4. Arches & Cables	: 423		
5. Truss	: 424		
6. Influence Line Diagram	: 425		
7. Miscellaneous	: 426		
		CONSTRUCTION MANAGEMENT	
		1. Construction Management	: 549
		WORKSHOP SCIENCE & CALCULATION	
		1. Workshop Science & Calculation	: 559
		ENGINEERING GRAPHICS	
		1. Engineering Graphics	: 595
		AUTOCAD	
		1 AutoCAD	: 653
		URBAN PLANNING & ARCHITECTURE	
		1. Urban Planning & Architecture	: 670



BUILDING MATERIAL AND CONSTRUCTION



CHAPTER

14

ROOF & ROOFINGS

GRADE III

1. In the King post truss there is a central vertical member joining with the tie beam. This joint is strengthened by the (275/2006)

- A. Struts
- B. Jib and cotter arrangement
- C. M.S. Strap
- D. Purlin and cleat

Ans: C

King post truss:

- In king post truss, the central vertical post called king post provides support for the tie beam.
- Two inclined members provided on either side of king post are known as struts and are used to prevent the principal rafter from bending at the centre.
- King post truss can be economically used for spans 5 to 8 metres.
- Suitable joints are provided between the rafter and tie beam, between the principal rafter and king post, between the king post and tie beam and at the ends of struts.
- The joints are further strengthened by straps or bolts.

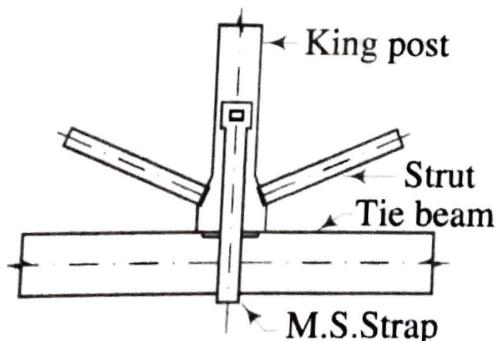


Fig.14.1. Joint provided at end of king post truss

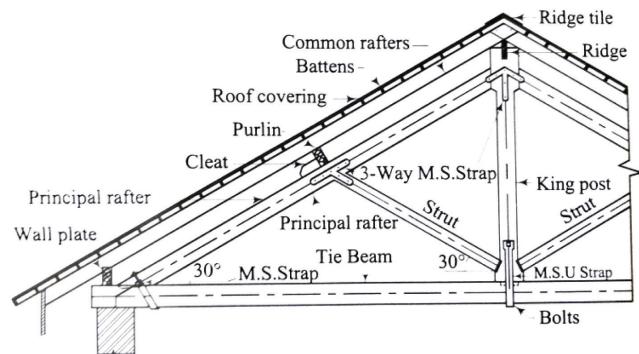


Fig.14.2 King post truss roof

2. The overlapping distance recommended for Asbestos cement roofing, along the length of the sheet is (275/2006, 57/2016, 134/008)

- A. 15 cm
- B. 30 cm
- C. 50 cm
- D. 40 cm

Ans: A

A.C. Sheets:

- Asbestos cement is a material which consists of 15 per cent of asbestos fibres evenly distributed and pressed with cement.
- The width of a A.C. sheet varies from 1.0 to 1.2 m and length from 1.75 to 3.0 m.
- To get sufficient strength with thin sections they are manufactured with corrugation
- They are fixed to the steel purlins using J-bolts.
- They are commonly used as covering materials in ware houses, godowns and halls.
- In auditorium etc., if these sheets are used, false ceilings are provided to get good thermal resistance.

- The sheets are usually laid with an end lap of 150 mm but this lap can be slightly adjusted to suit the spacing of purlins.

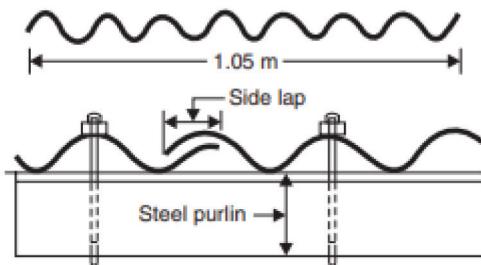


Fig.14.3 Corrugated sheet covers

Ans: B

Technical term in wooden pitched roof:

Span -Span or clear span is the clear distance between the supports. But effective span is the centre to centre distance between the supports.

Rise: Vertical distance between ridge and wall plate is known as rise of a pitched roof.

Pitch: Pitch is the inclination of sides of the roof with respect to the horizontal plane and can be represented in degrees or as a ratio of rise to span.

Ridge: Ridge is the apex or head line of a sloping roof and it is also known as apex line.

Hip: Hip is the external angle formed at the intersection of two roof slopes at an angle greater than 180°

Gable: If roof slopes in two direction, the closing wall in that portion may be a combination of triangular and rectangular wall. The triangular upper part of the wall formed at the end of pitched roof is known as gable.

Valley: When two roof surfaces meet together at an angle less than 180° , a valley is formed.

Eaves: Eave is the lower edge of a sloping roof.

Eaves board: Eaves board is a thin board of wood or metal sheet provided along the eaves connecting the ends of common rafter. It is used for better

appearance.

Wall plates: The member placed just above the wall to receive common rafters is known as wall plate. This member transfer load from common rafter to wall.

Purlins: Wooden members, which are used to connect trusses and to support common rafters. Purlin is placed horizontal over the principal rafter.

Rafters: Rafter is inclined member placed above the purlins extend from ridge to eave.

- Common rafters- Intermediate rafters which give support to the roof covering. Spacing of common rafter is 30 to 45 cm.
 - Hip rafter - Rafters provided at the junction of two roof slopes.
 - Jack rafter - Rafters shorter than common rafter.
 - Principal rafter - The top inclined member of truss.

Truss: Truss is a frame work of triangles, which transfer the load of roofing material, other members of roof, wind load, etc. to wall column.

Battens: Battens are small cross-sections of wood which are fixed on common rafter to support roofing materials like tiles, A.C. sheet, sheet, etc.

Cleats: Cleats are small pieces of steel or timber, angle or channel section used to prevent the sliding of purlins.

Verge: Edge of gable roof which runs between ridge and eaves.

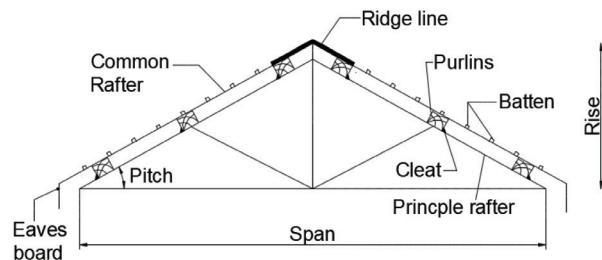


Fig.14.4 Roof

- 4. Slab or sheet of wood used to cover roof is
(264/2006, 42/2017)**

- A. Planks
 - B. Plate
 - C. Shingle
 - D. Slate

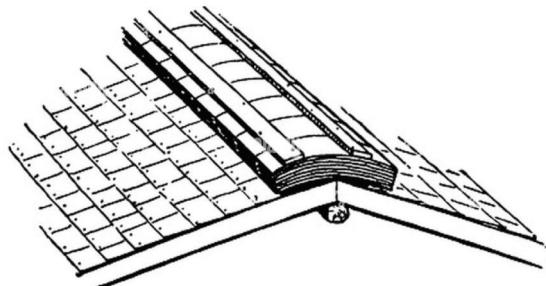
Ans: C

Plank:

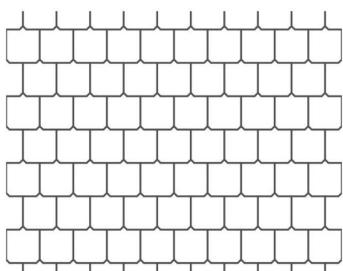
- It is a timber piece with parallel sides. Its thickness is less than 50 mm and width exceeds 150mm.

Shingles:

- Wood shingles are thin pieces of wood.
- Their size varies from 300 mm to 400 mm and length from 60 mm to 250 mm.
- Their thickness varies from 10 mm at one end to 3 mm at the other end-
- They are commonly used in hilly areas for low cost housing.
- They have very poor fire and termite resistance.

**Fig.14.5. Shingles****Slates:**

- A slate is a sedimentary rock.
- Its colour is grey. It can be easily split into thin sheets.
- Slates of size 450 mm to 600 mm wide, 300 mm long and 4 to 8 mm thick are used as covering materials of pitched roofs in the areas where slate quarries are nearby.
- A good slate is hard, tough, durable.
- They are having rough texture and they give ringing bell like sound when struck.
- They do not absorb water.

**Fig.14.6 Slates**

- 5. To cover one square meter of pitched roof _____ number of MP tiles are required**

(264/2006, 130/2014)

- | | |
|--------|--------|
| A. 256 | B. 48 |
| C. 16 | D. 100 |

Ans: C

The number of Mangalore tiles required to cover 1 square metre of roof area is about 16.

- 6. The apex part of a pavilion roof is**

(264/2006, 250/2006, 170/2008, 178/2009, 64/2017)

- | | |
|----------|-----------|
| A. Hip | B. Ridge |
| C. Gable | D. Purlin |

Ans: B

Refer question no.3, Grade III

- 7. Pitch of flat roof is**

(264/2006)

- | | |
|--------|-----------------|
| A. 0° | B. 30° |
| C. 45° | D. Both B and C |

Ans: A

Flat roofs are provided in areas which have less rainfall or have no snowfall. In flat roof too we have to provide some slope on surface to drain out the rain water otherwise there may be leakage of water. A flat roof is generally given a pitch of **1-10 degrees**. Commonly used flat roofs are:

- (a) Bengal terrace roof
- (b) Madras terrace roof
- (c) Reinforced brick cement roof
- (d) Reinforced cement concrete roof and
- (e) Filler slab.

- 8. Upper horizontal member of a queen post truss is** (264/2006, 32/2013, 30/2014)

- | | |
|-------------------|-------------------|
| A. Queen rod | B. Strut |
| C. Straining sill | D. Straining beam |

Ans: D**Queen post truss:**

- In queen post truss there are two vertical posts known as queen posts, two principal rafters, struts, tie beam, purlins and a straining beam.
- Straining beam is a horizontal beam, which keeps the upper end of queen post in position.

- A straining sill is provided on the tie beam between the queen posts to counteract the thrust of struts.
 - A queen post truss can be used for roof spans varying from 8 to 12 metres.

9. A kingpost roof truss is generally used for a span of (118/2007, 162/2012, 81/2013, 53/2015, 42/2017)

- A. 6-9 m
 - B. 10- 15 m
 - C. 3-5 m
 - D. 15-20m

Ans: A

Refer question no.1, Grade III

10. In order to reduce the size of rafters intermediate supports are introduced for rafters which are known as
(211/2007, 45/2011, 137/2014, 67/2014, 222/2007, 248/2007, 164/2012, 56/2012, 45/2014)

- A. Collar beam
 - B. Tie beam
 - C. Purlin
 - D. None of these

Ans: C

Refer question no.3, Grade III

- Collar beam - Horizontal member between two rafters
 - Tie beam - The beam which connects two or more columns or rafters in a roof or roof truss or in any height above floor level to make the whole structure more stiff and stable.

**11. The coupled roof is suitable for span up to
(134/2008, 108/2010)**

- A. 3.5 m B. 5m
C. Below 4.75mm D. Above 6.75mm

Ans: A

Coupled Roof

- It is formed by a pair of inclined rafters, centre ridge piece (at top) and wall plates (at bottom) for supporting the whole roof.
 - In this type of roof, the common rafters slope upwards from the opposite walls and they meet on a ridge piece in the middle.
 - Battens are supported on common rafters and roofing material on battens.
 - Span of couple roof is limited to 3.60m.

Refer Fig. 14.7

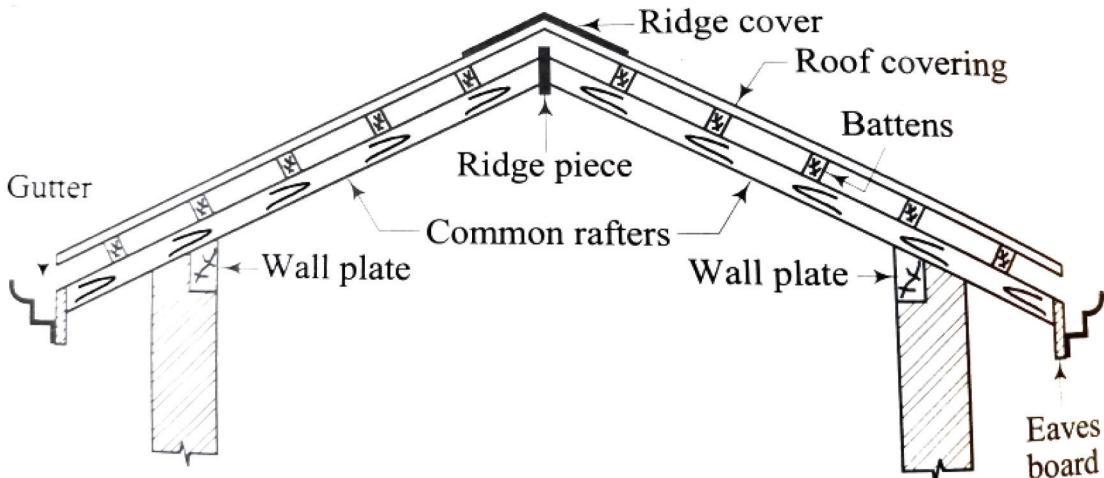


Fig.14.7 Couple Roof

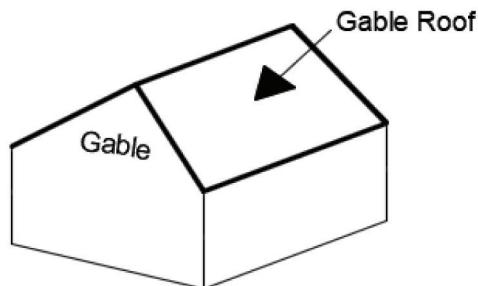
12. A roof which slopes in two directions is known as (134/2008)

- A. Hip roof
 - B. Gambrel roof
 - C. Mansard roof
 - D. Gable roof

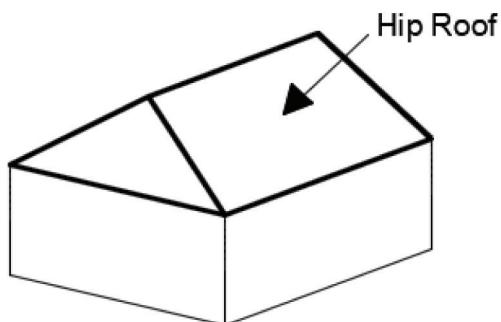
Ans: D

Gable roof

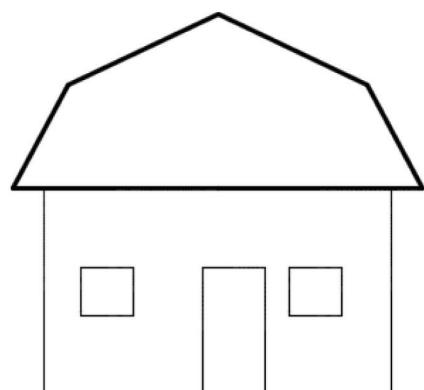
- It has slope in two directions.
 - The slopes meet at the ridge.
 - At the end face a vertical triangle (gable) is formed.
 - Used for small sheds.

**Fig.14.8 Gable Roof****Hip roof**

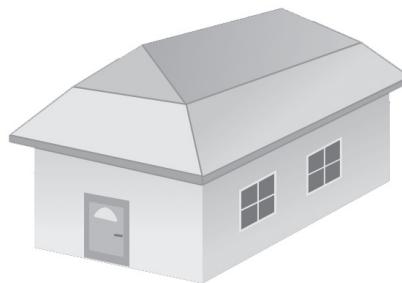
It slopes in 4 direction.

**Fig.14.9 Hip Roof****Gambrel roof**

This roof is like a gable roof, slope in two direction but there is a break in each slope.

**Fig.14.10 Gambrel Roof****Mansard or curved roof**

It is like a hip roof that slope in four direction but each slopes have a break thus sloping are formed.

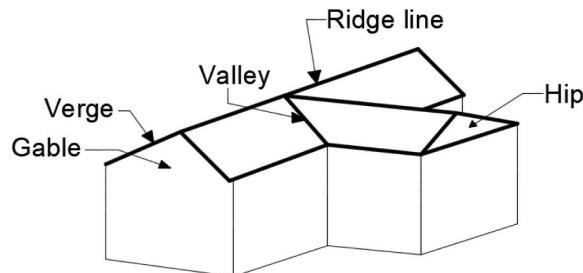
**Fig.14.11 Mansard Roof**

- 13. The triangular sloping roof surface formed at the end of pitched roof is known as(170/2008)**

- A. Gabled end
- B. Ridge
- C. Hipped end
- D. Eaves

Ans: C

Hipped end - At the end of a roof sloped triangular surface is formed which is called as hipped end.

**Fig. 14.12 Building with a pitched roof**

Refer question no.3, Grade III

- 14. The horizontal wooden member at the apex of the roof supporting the common rafter is (250/2006, 170/2008)**

- A. Ridge piece
- B. Purlins
- C. Batten
- D. Cleat

Ans: A

Refer question no.3, Grade III

- 15. In King post roof truss (170/2008, 94/2015, 115/2014)**

- A. Three vertical posts
- B. More than three vertical posts
- C. Two vertical posts
- D. Only one vertical post

Ans: D

Refer question no.1, Grade III

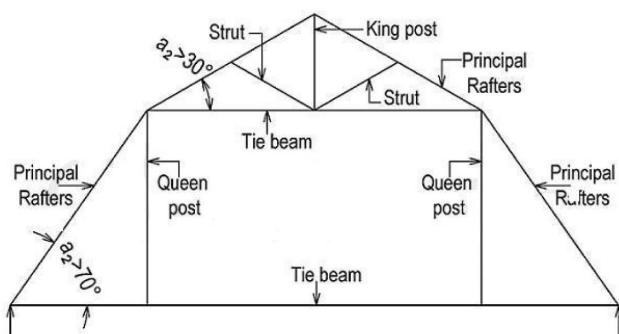
16. A mansard truss is

(207/2009)

- A. Similar to a king post truss
- B. Similar to a queen post truss
- C. A combination of queen post and king post truss
- D. Collar roof

Ans: C**Mansard Truss**

- This is a two storey truss with upper portion consisting of the king post truss and lower portion of queen post truss. It is thus a combination of the king post and queen post trusses.
- This truss has 2 pitches. The upper pitch(king post truss) varies from 30° to 40° and lower pitch (queen post truss) varies from 60° to 70°

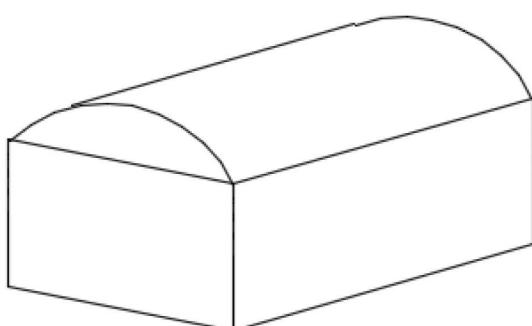
**Fig.14.13 Mansard roof truss****17. A pitched roof which slopes in all the four direction is called**

(207/2009, 86/2015, 70/2019, 160/2008, 143 /2017)

- A. Hipped roof
- B. Curved roof
- C. Purlin roof
- D. Lean to roof

Ans: A

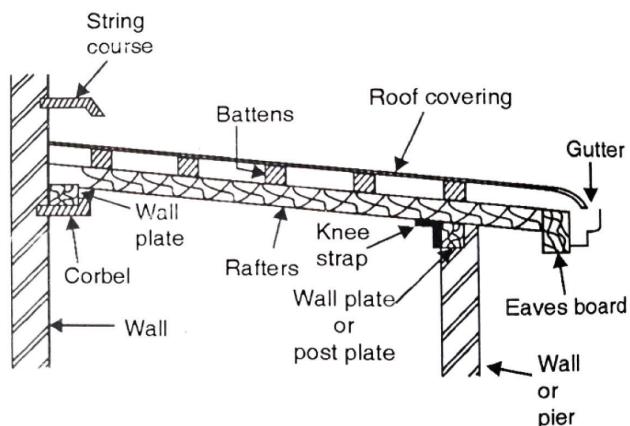
Refer question no.12, Grade III

**Fig.14.14 Curved Roof****Curved Roofs:**

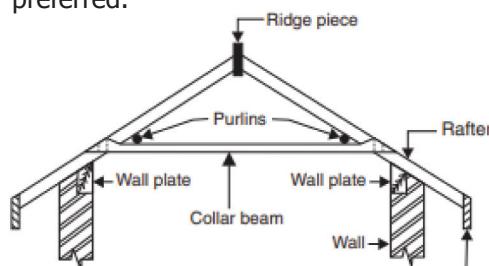
- Modification of pitched roof.
- Frequently employed in the modern age to cover large area and to give architectural effect.
- Used for big structures such as factories, monumental works, libraries, theatres, etc.

Lean to roof

- This is the simplest type of sloping roof and it used for covering verandah, sheds and out houses connected to main building, etc.
- Here on upper side common rafters are supported on a wall plate which in turn rest on a projecting corbel stone from the wall.
- In this case roofing material rest on battens, battens on common rafter and common rafter on wall plate.
- Maximum span of this roof is 2.5m

**Fig.14.15 Lean-to Roof****Double or Purlin Roofs:**

- If span exceeds, the cost of rafters increase and single roof becomes uneconomical.
- For spans more than 5 m double purlin roofs are preferred.

**Fig.14.16 Double or Purlin Roof**

- The intermediate support is given to rafters by purlins supported over collar beams.

18. A member subjected to tensile stresses is known as (207/2009, 86/2015)

- | | |
|-----------|---------------------|
| A. Tie | B. Strut |
| C. Purlin | D. Principal rafter |

Ans: A

Tie: Part of the structure that has tensile force acting on it.

Strut: Part of structure on which compressive force is acting on it.

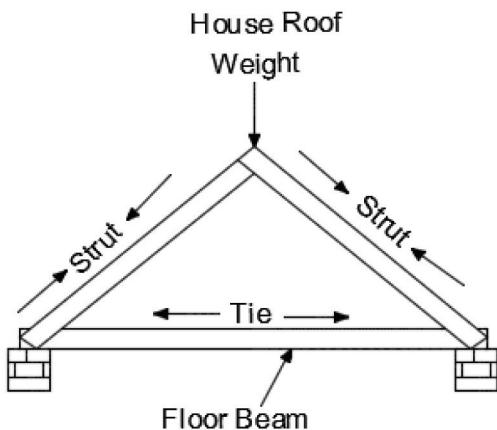


Fig.14.17 Strut and Tie

19. The roof provided for verandah is (185/2009, 42/2017, 213/2015)

- | | |
|-----------------|---------------|
| A. Hip roof | B. Gable roof |
| C. Lean to roof | D. Deck roof |

Ans: C

Refer question no. 12 and 17, Grade III

20. The outermost compression member of a truss is known as (185/2009)

- | | |
|------------------|---------------------|
| A. Purlin | B. Strut |
| C. Common rafter | D. Principal rafter |

Ans: D

Refer question no.3, Grade III

21. The beams resting on purlins are known as: (108/2010)

- | | |
|------------------|---------------------|
| A. Common rafter | B. Trimmers |
| C. Stringers | D. Principal rafter |

Ans: A

Refer question no.3, Grade III

Stringer: provide a framework or support to the tread and risers

22. Pick up the incorrect statement from the following: (45/2011, 42/2017, 263/2006)

- | |
|---|
| A. In a queen post truss, two vertical posts are used |
| B. In king post truss, one vertical post is used |
| C. In a queen post truss one vertical post is used |
| D. None of these |

Ans: C

Refer question no.8, Grade III

23. The member which is placed horizontally to support common rafter of a sloping roof is.

(45/2011, 57/2016)

- | | |
|--------------|-----------|
| A. Eve board | B. Purlin |
| C. Strut | D. Cleat |

Ans: B

Refer question no.3, Grade III

24. Queen post trusses are used when the span is: (45/2011, 130/2014, 060/2019, 292/2006, 29/2016)

- | | |
|--------------|-------------|
| A. 8 to 12 m | B. 5 to 8 m |
| C. < 5m | D. > 15 m |

Ans: A

Refer question no.8, Grade III

25. The top most part of the sloping roof is called (81/2013)

- | | |
|-----------|----------|
| A. Valley | B. Gable |
| C. Ridge | D. Hip |

Ans: C

Refer question no.3, Grade III

26. The lowest edge of the surface of a sloping section is called

(81/2013, 102/2018, 160/2008, 115/2014, 195/2015, 64/2017, 42/2017)

- | | |
|----------|-----------|
| A. Gable | B. Valley |
| C. Eaves | D. Cleats |

Ans: C

Refer question no.3, Grade III

27. The economic spacing of a roof truss depends upon (102/2014,108/2015)

- A. Cost of purlins and cost of roof coverings
- B. Cost of roof covering and dead loads
- C. Dead loads and live loads
- D. Live loads and cost of purlins

Ans: A

- The economic spacing of the truss is the spacing that makes the overall cost of trusses, purlins, roof coverings, columns, etc. the minimum.
- It depends upon the relative cost of trusses, purlins, roof coverings, spacing of columns, etc.

28. The simplest type of sloping roof in which rafters slop to one side only (137/2014)

- | | |
|----------------------|---------------------|
| A. Couple roof | B. Collar beam roof |
| C. Couple close roof | D. Pent roof |

Ans: D

A pent roof is a small single-slope roof that is attached to a house just above the first floor's windows and doors.

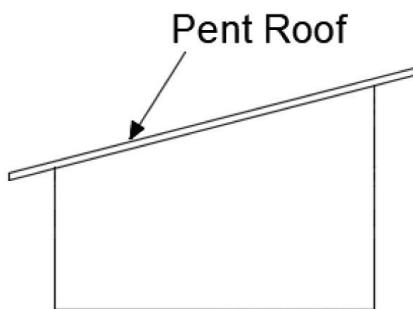


Fig.14.18 Pent Roof

Collar beam Roof: It is a variation of couple close roof.

- The tie beam is raised and placed at a higher level.
- The tie beam is then known as a collar or a collar beam
- It is adopted to economise the space and to increase the height of room.
- Collar beam usually fixed at $\frac{1}{3}$ to $\frac{1}{2}$ to the vertical height from the wall to the ridge.
- The lower is the collar, the stronger is the roof.
- Span maximum upto 4.80m

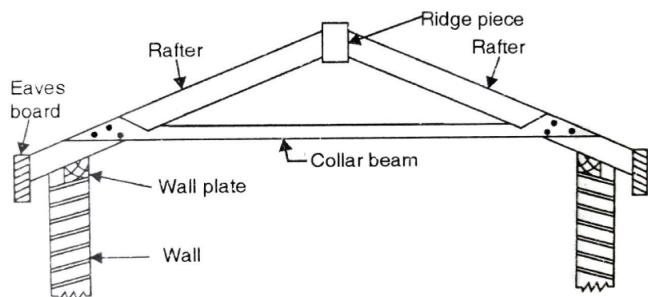


Fig.14.19 Collar beam Roof

Couple close roof: Legs of the common rafters are connected by a tie beam.

- It prevents the tendency of rafters to spreadout and thus the danger of overturning of the walls is avoided.
- Can be adopted economically upto a span of 4.20 m

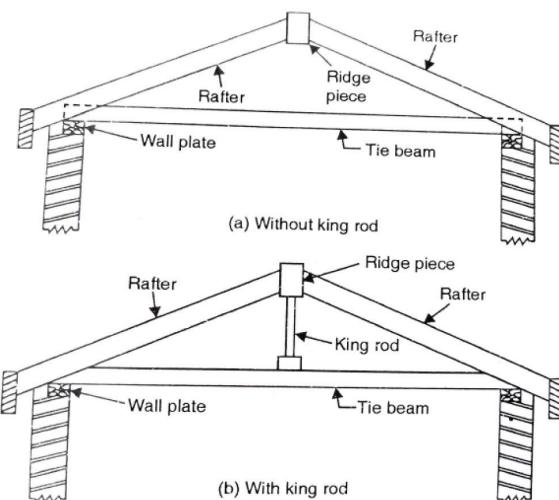


Fig.14.20 Couple close Roof

29. A roof has slop in all the four directions, like hip roof and a plane surface formed at the top will be: (137/2014, 67/2014)

- | | |
|-----------------|-----------------|
| A. Deck roof | B. Hip roof |
| C. Gambrel roof | D. Mansard roof |

Ans: A

Refer question no.12, Grade III

Deck roof:

It has slope in all four directions like a hip roof but deck or plane surface is formed at the top.

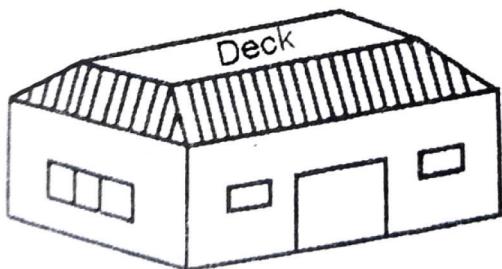


Fig.14.21 Deck Roof

30. The ridge formed by the intersection of two sloping surfaces, the interior angle is greater than 180° is: (137/2014, 42/2017, 292/2006)

- A. Ridge
- B. Eaves
- C. Valley
- D. Hip

Ans: D

Refer question no.3, Grade III

31. In the case of asbestos cement sheets, the unsupported length of overhang at the eaves of the sheets should not exceed (137/2014)

- A. 100 mm
- B. 200 mm
- C. 250 mm
- D. 300 m

Ans: D

The free overhang at eaves, measured as the length of sheet from its lower edge to the centre of bolt holes shall not be more than 300 mm for 6 mm thick sheets and 150 mm for 4 mm thick (shallow corrugations) sheets. [IS3007-1 (1999)]

32. A couple closed roof is used for span upto: (141/2016, 30/2014, 41/2015, 196/2015)

- A. 3.5m
- B. 5m
- C. 9m
- D. 14m

Ans: B

Refer question no.28, Grade III

33. The inclined braces used in a truss to prevent the sagging of the principal rafters is: (141/2016, 248/2007, 202/2008)

- A. King post
- B. Tie beam
- C. Queen post
- D. Strut

Ans: D

Refer question no.1, Grade III

34. The usual rise of tiled roof shall be (102/2018)

- A. 1/3 span
- B. 2/3 span
- C. 1/4 span
- D. 1/6 span

Ans: A

The usual rise of tiled roof shall be 1/3 span.

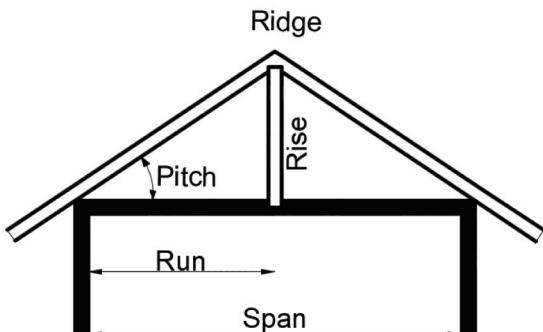


Fig.14.22 Specification of Roof

35. Wooden plank on which roof covering is fixed

(060/2019, 332/2005, 250/2006, 202/2008, 42/2017, 060/2019, 160/2008, 263/2006, 237/2007)

- A. Purlin
- B. Hip
- C. Rafter
- D. Battens

Ans: D

Refer question no.3, Grade III

36. A two storey truss with upper portion consisting of the king post truss and lower portion of queen post truss. (008/2021, 164/2012)

- A. Truncated truss
- B. Composite truss
- C. Mansard truss
- D. Bell fast truss

Ans: C

Refer question no.16, Grade III

Truncated roof Truss

- A truncated truss is similar to Mansard truss, except that its top is formed flat, with a gentle slope to one side.
- This type of truss is used when it is required to provide a room in the roof

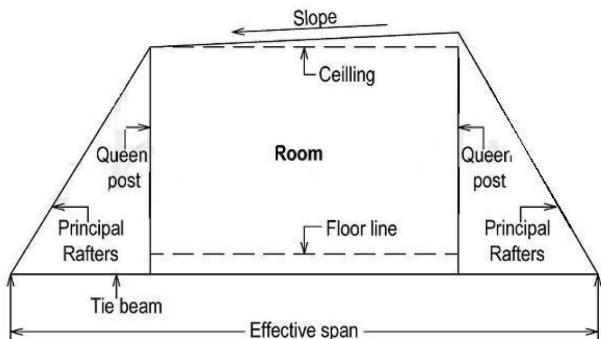


Fig.14.23 Truncated Roof Truss

Belfast roof Truss

- Also known as latticed roof or lowstring truss.
 - This type of truss roof can be used for long spans of about 30 meters, provided the light roof covering is used.

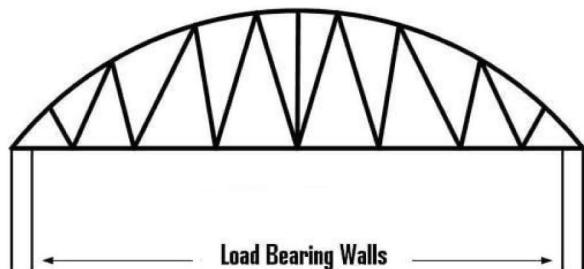
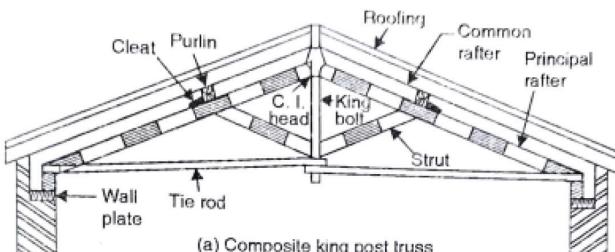


Fig.14.24 Belfast roof Truss

Composite truss

- These trusses are composed of wooden members and steel or wrought iron members.
 - Light in weight and economical.



(a) Composite king post truss

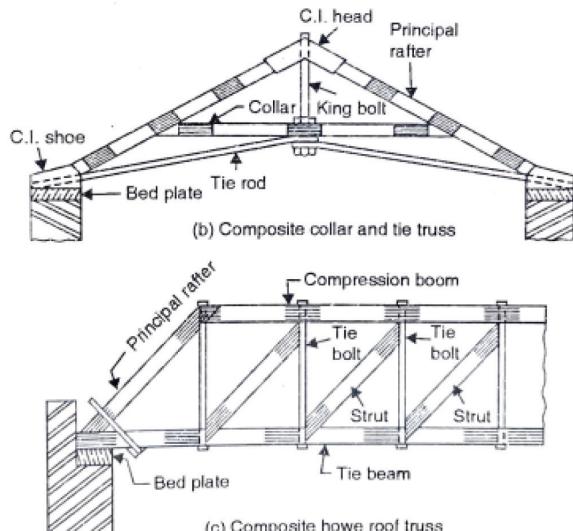


Fig.14.25 Composite Roof Truss

37. The small blocks of wood which are fixed on the trusses to prevent the sliding of purlins is called (32/2015, 137/2014, 27/2016)

- A. Cleats
 - B. Battens
 - C. Pitch
 - D. Hip

Ans: A

Refer question no.3, Grade III

- 38. The span of couple roof is limited to (082/22)**

- A. 2.5m
 - B. 3.6m
 - C. 4.2m
 - D. 4.8m

Ans: B

Refer question no.11, Grade III

- 39. Which of the following tiles are conical in shape? (082/22)**

- A. Corrugated
 - B. Guna
 - C. Flemish
 - D. Flat

Ans: B

Guna Tiles:

- They are conical in shape with a base of 100 mm diameter at the broader end and 75mm at the narrower end.
 - The thickness of the annular rise is 6mm.
 - They can be manufactured on the potters wheel.
 - According to their conical shape, they can be inserted into another to form a ring.

- The ring may be made of suitable ways like circular, parabolic, elliptical etc.

Corrugated tiles:

- These tiles have corrugations and when they are placed in position aside lap of one or two corrugations is formed.
- The placing of such tiles on a roof gives an appearance of corrugated galvanized iron sheets.

Flat tiles:

- These tiles are rectangular and are of various dimensions.
- They are laid in cement or lime mortar

40. The member used in inclined position for supporting the strainer post is (210/2015)

- | | |
|----------------|--------------------|
| A. Tension rod | B. Compression rod |
| C. Strut | D. Tie beam |

Ans : C

Refer question no.1, Grade III

Tie: It is a tension member.

Principal strut: It is a top chord member of a roof truss or a truss girder subjected to heavy axial compression

Compression members: The members subjected to axial compressive force are called compression members.

Following are some examples of compression members

- Strut:** It is a web member of a roof truss or brace frame subjected to light axial compressive loads.
- Principal strut:** It is a top chord member of a roof truss or a truss girder subjected to heavy axial compression
- Column or post or stanchion:** It is a vertical member of a steel building frame that is used to support a floor girder or floor subjected to heavy axial compressive loads.
- Boom:** It is a principle compression member of a crane

GRADE II

1. **Rafters are bird's mouthed over the wall plates.**
Why? (262/2006)

- A. To make the roof stronger
- B. To prevent their slipping
- C. To brace the whole truss
- D. To support the king post

Ans: B

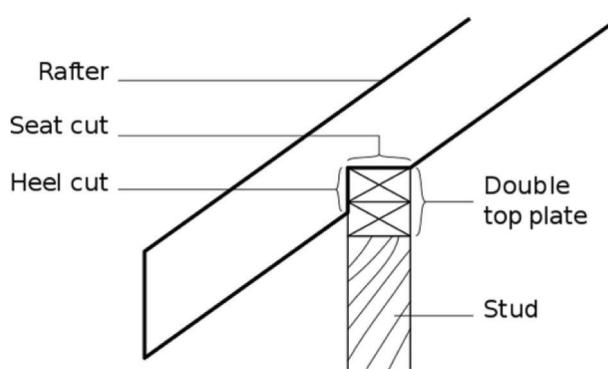


Fig.14.26 Birds mouth Joint

- A birds mouth joint or bird's beak cut is an indentation cut into the rafter which consists of a seat cut (the face of which rests on the top plate) and a heel cut (the face of which lies parallel to the supporting wall), forming a shape resembling a bird's mouth
 - The notch formed by the seat and heel cut line called the bird's-mouth.
 - This joint prevents the slipping of rafter.
2. **The edge of a gable running between the eaves and ridge is known as (32/2013, 61/2020, 92/2016, 27/2016, 32/2013)**

- A. Verge
- B. Purlin
- C. Common rafter
- D. Hip rafter

Ans: A

Refer question no.3, Grade III

3. **The maximum span of a lean-to roof is _____ mts:** (213/2015)

- A. 2.4m
- B. 2.6m

- C. 2.10m
- D. None of these

Ans: A

Refer question no.17, Grade III

4. **A king post Truss consists of two longer inclined member known as** (173/2015)

- A. Struts
- B. Principal rafter
- C. King post
- D. Beam

Ans: B

Refer question no.1, Grade III

5. **The type of roof which slopes in two directions with a break in the slope on each side is called** (85/2016)

- A. Gable roof
- B. Hip roof
- C. Gambrel roof
- D. Mansard roof

Ans: C

Refer question no.12, Grade III

6. **Higher pitch of roof** (85/2016)

- 1. Results in stronger roof
- 2. Require more Covering material
- 3. Results in weaker roof
- 4. Require less covering material
- A. 1 and 2
- B. 1 and 4
- C. 2 and 3
- D. 2 and 4

Ans: A

A higher pitch will sustain a greater vertical load under gravity than a low pitch constructed of the same materials.

7. **The rafters which are provided at the junction of two roof slope is called** (24/2017, 124/2017)

- A. Jack rafter
- B. Common rafter
- C. Hip rafter
- D. Principle rafter

Ans: C

Refer question no.3, Grade III

8. **The stone used for roofing purpose is known as _____** (42/2017, 70/2013)

- A. Marble
- B. Sandstone
- C. Slate
- D. Pumice

Ans: C

Refer question no.4, Grade III

- 9. The ridge formed by the intersection of two sloped surface having an exterior angle greater than 180° is** (42/2017)
- A. Gable B. Hip
C. Valley D. Eave

Ans: B

Refer question no.3, Grade III

- 10. The roof provided for varanda is** _____ (42/2017)
- A. Hip roof B. Lean-to roof
C. Deck roof D. Gable roof

Ans: B

Refer question no.17, Grade III

- 11. A sloping roof is known as _____ roof.** (083/2018)
- A. Curved roof B. Flat roof
C. Pitched roof D. Lean-to-roof

Ans: C

In the areas of heavy rain falls and snow fall sloping roof are used. The slope of roof shall be more than 10° . They may have slopes as much as 45° to 60° also.

- 12. Length of common rafter in a tiled roofing, when the rise of roof is $1/3$ rd span is:** (70/2019)

- A. 0.45 eave span B. 0.50 eave span
C. 0.55 eave span D. 0.60 eave span

Ans: D

Length of common rafter in a tiled roofing, when the rise of roof is $1/3$ rd span is 0.60 eave span.

- 13. Common rafters shorten in length which runs from a hip to the eaves or from a ridge to valley are called** (97/2017)

- A. Crown rafter B. Principal rafter
C. Jack rafter D. Valley rafter

Ans: C

Refer question no.3, Grade III

- 14. The lower end of a hip rafter is generally supported on a diagonal piece of wood which**

is laid across the corner of the wall. The diagonal piece is known as (065/21)

- A. Dragon beam B. Dragon tie
C. Angle tie D. All of the above

Ans: D

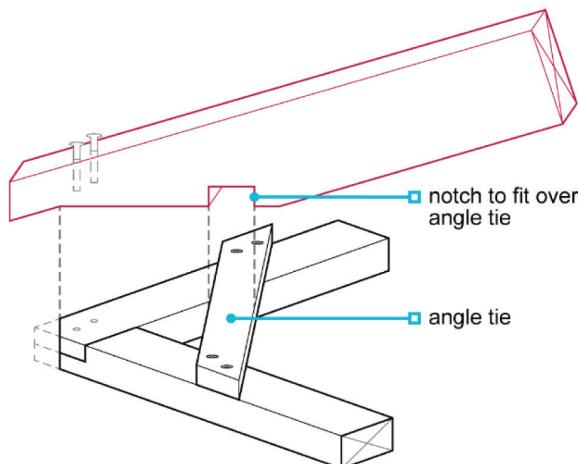


Fig.14.27 Dragon Beam

- 15. The tiles are burnt in typical kiln, known as** (065/21)

- A. Sialkote kiln B. Cupola Furnace
C. Hoffman's kiln D. Clamps

Ans: A

- 16. Which of the following tiles having semi circular corrugations in longitudinal directions?** (109/21)

- A. Pot tiles B. Pan tiles
C. MP tiles D. Sial kot tiles

Ans: A

Pot tiles:

- Also known as half round country tiles
- These tiles are semi-circular in section at each end, but the diameter tapers longitudinally.

Pan tiles:

- They are flat longitudinally, but are curved transversely to a flat wave or S-curve.

- 17. A short sections of wood or steel which are fixed on the principal rafters of trusses to support the purlin is** (034/22)

- A. Template B. Post plate
C. Cleats D. Wall plate

Ans: C

Refer question no.3, Grade III

GRADE I

- 1. The simplest type of sloping roof in which rafters slope to one side only can be called as (292/2006)**
- A. Couple roof B. Lean to roof
C. Couple close roof D. Collar beam roof

Ans: B

Refer question no.17, Grade III

- 2. In areas where rainfall is very heavy, the suitable type of roofing is (131/2007, 083/2018)**

- A. Curved roofs
B. Terraced roofs
C. Pitched roofs
D. Light weight flat roofing

Ans: C

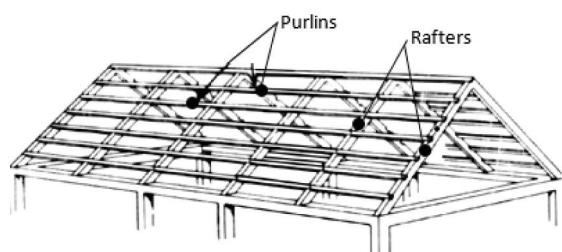
Refer question no.11, Grade III

- 3. In a steel roof truss the roofing material is supported directly on (248/2007)**

- A. Purlins B. Cleats
C. Principal rafter D. Main ties

Ans: A

- The members which support the covering material of a steel roof truss are called purlins.
- Purlins are beams of light sections spanning between trusses carrying dead load of roof, live load and wind load.
- Purlins transmit these loads to the trusses.

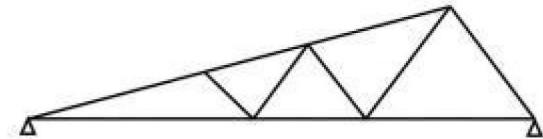
**Fig.14.28 Components of Roof**

- 4. North light roof is usually adopted for the roof of (160/2008)**

- A. Residential building B. Commercial building
C. Factory building D. Office building

Ans: C

- North light trusses are traditionally used for short spans in industrial workshop-type buildings.
- They allow maximum benefit to be gained from natural lighting.

**Fig.14.29 North light Truss**

- 5. In village, the material used for covering the pitched roof is (160/2008, 29/2016)**

- A. Thatch B. Country tiles
C. A.C Sheets D. G.I sheets

Ans: A

Various types of covering materials are available for pitched roofs and their selection depends upon the climatic conditions, fabrication facility, availability of materials and affordability of the owner.

Commonly used pitched roof covering materials are:

- Thatch
- Shingle
- Tiles Slates
- Asbestos cement (A.C.) sheets
- Galvanised iron (G.I.) sheets

Thatch Covering:

- These coverings are provided for small spans, mainly for residential buildings in villages.
- Thatch is a roof covering of straw, reeds or similar materials.
- The advantage of thatch roof is they are cheap and do not need skilled workers to build them.
- The disadvantages are they are very poor fire resistant and harbour rats and other insects.
- It is unstable against high wind.

Tiles:

- Various clay tiles are manufactured in different localities.

- They serve as good covering materials. Tiles are supported over battens which are in turn supported by rafters/trusses etc. Allahabad tiles, Mangalore tiles are excellent inter-locking tiles.
- They give good appearance also.
- These are used for cheap buildings.
- If tiles are laid in two layers, the roof is known as double tiled roof.
- An overlap of atleast 80mm should be provided when these tiles are used.
- Liable to break easily hence require frequent re-placement.

G.I. Sheets:

- Galvanised iron corrugated sheets are manufactured in the sizes 1.0 to 1.2 m wide and 1.65 m length. Galvanisation of iron makes them rust proof.
- They are durable, fire proof, light in weight and need no maintenance
- They are commonly used as covering materials for ware houses, godown, sheds etc.

For more Refer question no.2, Grade III

6. The vertical distance between the wall plate and top of the ridge is called (164/2012)

- | | |
|----------|-------------|
| A. Pitch | B. Headroom |
| C. Rise | D. Span |

Ans: C

Refer question no.3, Grade III

7. The type of pitched roof, only common rafters to each slope without any intermediate (151/2013)

- | | |
|-----------------|----------------|
| A. Trussed roof | B. Single roof |
| C. Lean-to-roof | D. Couple roof |

Ans: B

Lean to roof, couple roof, couple close roof, collar beam roof and collar & Scissors roof are the some varieties of a single roof.

8. Which of the following statement is not correct (151/2013)

- | |
|--|
| A. Flat roof require lesser area of roofing material than sloped roof. |
| B. Flat roof not avoids the enclosure of the triangular space. |

- The leak in a flat roof is difficult to trace and rectify.
- In a multi-storeyed, flat roof is considered to be the best choice.

Ans: B

9. A roof is designated as pitch roof if its slope is more than: (45/2014)

- | | |
|---------------|---------------|
| A. 10 degrees | B. 15 degrees |
| C. 30 degrees | D. 45 degree |

Ans: A

Refer question no.33, Grade III

10. The extension of wall above the roof level is called (11/2016)

- | | |
|-------------------|-----------------|
| A. Retaining wall | B. Dummy wall |
| C. Breast wall | D. Parapet wall |

Ans: D

Parapet: An extension of the wall at the edge of a roof, terrace, balcony.

Retaining wall: Retain earth pressure against an artificially cut edge or excavation edge in soil.

Breast wall: Sustain earth against a natural slope such as the hillside of a mountain road.

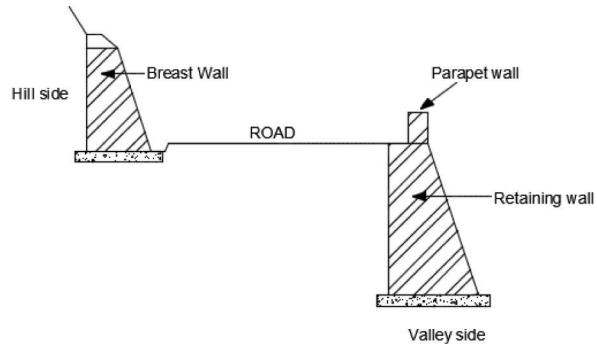


Fig.14.30 Breast wall, Retaining wall, Parapet wall

11. The term pitch in connection with pitched roofs is defined as the (11/2016)

- Apex line of the sloping roof
- Inclination of the sides to the horizontal plane of the roof
- Horizontal distance between the internal faces of the walls
- Valley line of the pitched roof

Ans: B

Refer question no.3, Grade III

12. Roof truss is provided when the span is (64/2016)

- A. Less than 4 in
- B. More than 5 m
- C. Between 4 m and 5 m
- D. All of these

Ans: B

- When span is greater than 4.8 metres or where intermediate supports for purlins and ties are not available, trusses are used.
- The triangular shape of truss frame offers greater rigidity and here load transmission to wall is vertical.

13. The roof slopes in the four directions, but each slope has a break is (96/2016)

- | | |
|-----------------|-----------------|
| A. Deck roof | B. Mansard roof |
| C. Gambrel roof | D. Hip roof |

Ans: B

Refer question no.12, Grade III

14. The roof truss to be used when a room is required to be provided in the roof is (59/2019)

- | | |
|-----------------------|-------------------------|
| A. Belfast roof Truss | B. Scissors truss |
| C. French truss | D. Truncated roof Truss |

Ans: D

Refer question no.37, Grade III

Scissors truss:

Two collar beam are crossing each other to present an appearance of scissor.

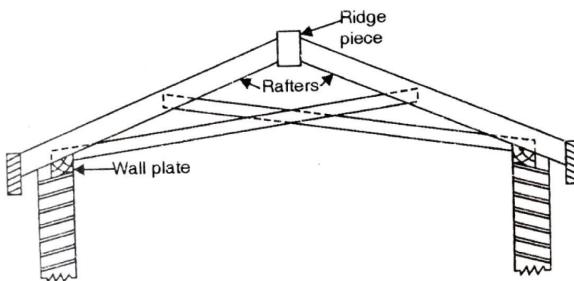


Fig.14.31 Collar and scissors Roof

French truss

A symmetrical truss used in supporting large sloping roofs; in the form of three isosceles triangles—one in the center with its base along the horizontal tie, and each of the outer two having its base along the sloping sides of an upper chord.

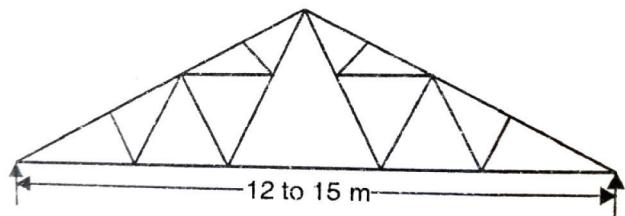


Fig.14.32 French Truss

15. The highest line of sloping roof where two opposite slopes meet is known as (101/21)

- | | |
|----------|-----------|
| A. Ridge | B. Rafter |
| C. Eave | D. Purlin |

Ans: A

Refer question no.3, Grade III

16. Couple roof is used for spans (101/21)

- | | |
|-----------------|---------------|
| A. 3.5m or less | B. 3.5m to 5m |
| C. 5m to 6.5m | D. 6.5m to 8m |

Ans: A

Refer question no.11, Grade III

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TABLE OF CONTENTS

SURVEYING

1. Basics of Surveying : 12
2. Chain Survey & Linear Measurements : 35
3. Compass Survey : 66
4. Plane table Survey : 100
5. Theodolite Survey : 113
6. Levelling : 135
7. Contouring : 172
8. Traverse Survey & Omitted Measurements : 182
9. Tacheometric Survey
 & Trigonometric Levelling : 197
10. Curves : 205
11. Area & Volume Calculation : 217
12. Minor Instruments : 227
13. Hydrographic Survey : 239
14. Field Astronomy : 247
15. Total station & EDM : 251
16. Global Positioning System : 258
17. Remote Sensing & GIS : 262
18. Photogrammetric Survey : 266
19. Triangulation : 268
20. Route survey : 269

ENVIRONMENTAL ENGINEERING

1. Water Demand & Population Forecasting : 271
2. Sources & Supply of Water : 276
3. Water Treatment & Distribution : 280
4. Water Quality Control : 298
5. House Drainage System : 310
6. Sewerage System : 322
7. Environmental Pollution : 340
8. Solid Waste Management : 344

GEOTECHNICAL ENGINEERING

1. Origin & Properties of Soil	: 348
2. Index Properties of Soil	: 358
3. Classification of Soil	: 362
4. Stress Distribution	: 364
5. Permeability	: 366
6. Seepage Analysis	: 368
7. Shear Strength	: 370
8. Compaction	: 373
9. Consolidation	: 377
10. Earth Pressure & Retaining wall	: 379
11. Slope Stability	: 383
12. Shallow Foundation	: 384
13. Deep Foundation	: 394
14. Soil Exploration & Stabilization	: 404

FLUID MECHANICS & HYDRAULIC MACHINES

1. Properties of Fluid	: 410
2. Pressure Measurement	: 420
3. Buoyancy & Floatation	: 429
4. Fluid Kinematics	: 434
5. Energy & Momentum Equations & Applications	: 439
6. Laminar & Turbulent Flow	: 443
7. Flow through Pipes	: 445
8. Boundary layer theory	: 452
9. Notches & Weirs	: 453
10. Orifices & Mouth pieces	: 456
11. Model analysis & Dimensional analysis	: 459
12. Open Channel flow	: 461
13. Hydraulic Machines	: 466

IRRIGATION ENGINEERING

1. Water Requirement of Crops	: 477
2. Methods of Irrigation	: 487
3. Dams, Weirs & Spillways	: 494
4. Canal & Canal Regulators	: 506

5. Silt theories & Design of Canals	: 516
6. River training works, Diversion head works & CD works.	: 518

ENGINEERING HYDROLOGY

1. Precipitation	: 529
2. Losses in Precipitation	: 537
3. Runoff & Hydrographs	: 539
4. Flood estimation & Flood Routing	: 545
5. Well Hydraulics	: 547

TRANSPORTATION ENGINEERING

1. Highway Development & Planning	: 553
2. Cross-Sectional Elements of Road	: 557
3. Sight Distances	: 568
4. Horizontal Alignment	: 571
5. Vertical Alignment	: 577
6. Highway Materials & Testing	: 580
7. Rigid & Flexible Pavement Design	: 586
8. Hill Roads	: 593
9. Traffic Engineering	: 595
10. Airport, Bridge, Harbor and Tunnel Engineering	: 599

RAILWAY ENGINEERING

1. Introduction, Gauges & Permanent way	: 612
2. Track Components	: 617
3. Geometric design of Railway Tracks & Turnouts	: 628
4. Railway Signals	: 634

BUILDING BY-LAWS

1. Building By-laws	: 637
---------------------	-------

MECHANICAL ENGINEERING

1. Mechanical Engineering	: 657
---------------------------	-------

MISCELLANEOUS

1. Miscellaneous	: 698
------------------	-------

CHAPTER

2

TRACK COMPONENTS

GRADE III

- 1. The slope given to the wheel of a train, to prevent from rubbing the inside face of the rail is (185/2009)**

- A. Roaring of wheel B. Coning of wheel
C. Creep of wheel D. Wearing of wheel

Ans: B

The Surface of wheels are made in cone shape at an inclination of 1 in 20, and the same slope is provided in the rails this is known as coning of wheels.

Purpose:

- To keep the train in its central position of the rails, coning does not allow any sidewise movement on a straight track.
- To allow the wheels to move different distances on a curved track and thereby reduce wear and tear

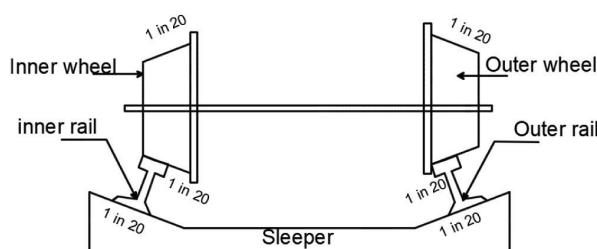


Fig 2.1 Coning of wheel

- 2. The minimum depth of ballast provided in a railway track is (207/2009 ,86/2015)**

- A. 30 cm B. 20 cm
C. 40 cm D. 50 cm

Ans: B

Depth and length of ballast for BG, MG and NG are

Table 2.1. Gauge and corresponding length and depth

Gauge	L	D
B.G	335cm	200-250 mm
M.G	230cm	150-200mm
N.G	185cm	150 mm

So minimum depth of ballast is 20mm

- 3. An ideal sleeper in many ways is (45/2011)**

- A. Wooden sleeper B. Steel sleeper
C. Cast iron sleeper D. Concrete sleeper

Ans: A

An ideal sleeper should possess the following characteristics

- Economical
- Easily adjustable and maintenance
- Should not be too heavy or light
- Durable
- Should be able to maintain correct gauge
- Bearing area of sleepers should be enough to resist crushing
- Should facilitate easy removal and replacement of ballast
- Should resist shock and vibration
- Suitable for track circuiting
- Should have scrap value

Considering all the above conditions Wooden sleeper is the ideal sleeper

4. The sleeper of highest scrap value is (45/2011)

- A. Wooden sleeper
- B. Steel sleeper
- C. Cast iron sleeper
- D. Concrete sleeper

Ans: C

One of the main advantages of cast iron sleepers compared to other types of sleepers is its scrap value. Steel sleeper is liable to corrosion reducing its scrap value

5. The rail section first designed in Indian Railways was (102/2014)

- A. Double headed type
- B. Flat footed type
- C. Bull headed type
- D. I section

Ans: A

Types of rail section used in construction of Indian railway tracks are

Double headed rails

- The first rail section designed by Indian Railway
- Consists of three parts a) upper table, b) web, c) lower table
- Both upper table and lower table are identical
- When upper tables are worn out, then the rails can be inverted and reused
- Not used nowadays

Bull headed rails

- Evolution after double headed rail
- Consists of three parts a) Head b) web c) foot
- Head is larger in size than foot
- Usually used for making points and crossing

Flat footed rail

- In India, flat footed are most commonly used and 90% of railway tracks in world are flat footed
- Foot is spread out to form base

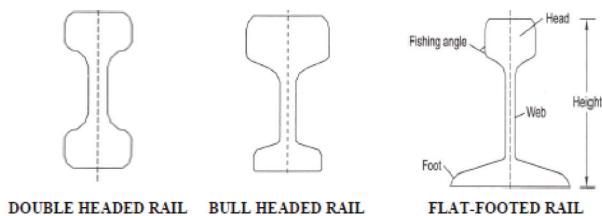


Fig 2.2 Type of rail section

6. The best wood for sleeper is (141/2016)

- A. Sal
- B. Teak
- C. Deodar
- D. Chirr

Ans : B

Sal and teak both are hardwood are most commonly used for sleepers in India.

Sal is both heavier and stronger than teak wood but because teak has great resistant towards fungal decay and white ants that's why it's considered best

7. Primary function of a sleeper is to (58/2017 ,143/2017)

- A. Take loads from rails
- B. Maintain gauge
- C. Stability to track
- D. Giving direction

Ans: B

Main function of sleepers is:

- Hold the rail to correct gauge and alignment which is the primary function
- Give a firm and even support to rail
- Transfer the load in a uniform way from rail to ballast
- Act as an elastic medium between rails and ballast to absorb the blows and moving load
- Provide longitudinal and lateral stability to the permanent way

8. Stone generally preferred for railway ballast is (58/2017 ,237/2007)

- A. Basalt and granite
- B. Marble
- C. Sandstone
- D. Slate

Ans: A

- The stone to be used as railway ballast should be hard, tough nonporous and should not decompose when exposed to air and light.
- Igneous rocks like quartzite, basalt, trap and granite forms the excellent ballast materials.
- When these are not available then lime stone and sand stone can also be used as good ballast material.

**9. Width of ballast section for Broad Gauge is
(24/2017)**

- A. 1.83 m B. 2.25 m
C. 3.35 m D. 4.30 m

Ans: C

Table 2.2 Ballast specification

Perticulars	Broad gauge	Meter gauge	Narrow gauge
Width of ballast	3.35 m	2.25m	1.83m
Depth of ballast	20 to 25cm	15 to 20 cm	15cm
Quantity of stone ballast per m length	$1.036m^3$	$0.71m^3$	$0.53m^3$

**10. The tread of wheels is provided an outward slope of
(24/2017)**

- A. 1 in 10 B. 1 in 20
C. 1 in 15 D. 1 in 25

Ans: B

GRADE II

1. The main function of sleepers, is (263/2006)

- A. To support rails
- B. To hold rails at correct gauge
- C. To distribute load from the rails to ballast
- D. All the above

Ans: D

Refer question no. 7, Grade III.

2. The commonly used rails in India (237/2007)

- | | |
|------------------|----------------|
| A. Double headed | B. Bull headed |
| C. Bull footed | D. Flat footed |

Ans: D

Refer question no. 5, Grade III.

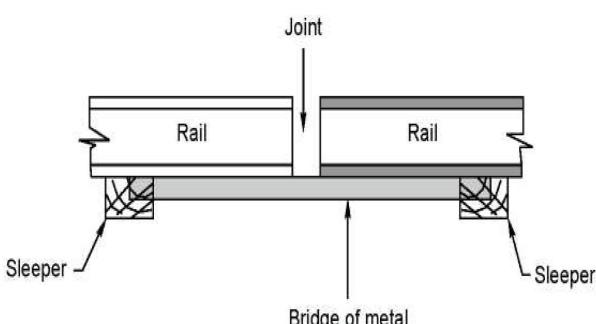
3. The rail joints placed at the centre of two consecutive sleepers is called (178/2009)

- | | |
|--------------------|--------------------|
| A. Suspended joint | B. Bridge joint |
| C. Supported joint | D. Staggered joint |

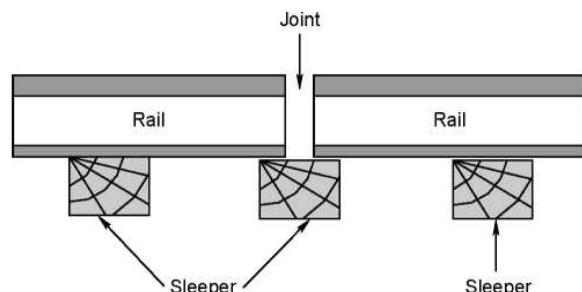
Ans: A

Suspended joint: The rail joint when placed at the centre of the two consecutive sleeper is known as suspended joint.

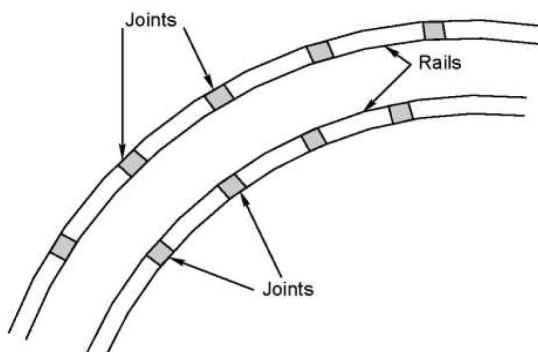
Bridge joint: This joint is just similar to the suspended joint. But in this case a length of metal serving as bridge is used to connect the end of two rail so that there are no bending stresses in rail.

**Fig 2.3 Bridge joint**

Supported joint: When the sleeper is placed exactly below the rail joint it is known as supported joint

**Fig 2.4 Supported joint**

Staggered joint: The joints on railway track are not directly opposite to the joints of the rail track. These joints are generally provided on curves

**Fig 2.5 Staggered joint****4. The longitudinal movement of rail is known as (178/2009)**

- | | |
|------------------|-------------------------|
| A. Creep of rail | B. Displacement of rail |
| C. Wear of rail | D. Buckling of rail |

Ans: A

Creep is the longitudinal movement of rail in the track in the direction of locomotive

Major causes of creep are,

- Force developed during the starting and stopping of train by application of brakes
- Due to wave motion developed when the wheels of the vehicle reach the crest
- Difference in temperature along the track

5. For railways ballast, the stone should be: (28/2011)

- A. Soft with a uniform texture
- B. Hard, dense, durable, tough and easily workable
- C. Hard, heavy, strong and durable
- D. Hard, tough, resistant to abrasion and durable

Ans: D

Refer question no. 8, Grade III.

6. The granular material which is used in packing under and around the sleeper for transferring the load to the formation is

(67/2014)

- A. Block
- B. Doctor
- C. Goods stock
- D. Ballast

Ans: D

Ballast: Is a layer of broken stones or brick, gravel, or any other granular material placed and packed below and around sleepers for distributing load from the sleepers to the formation.

It provides drainage as well as longitudinal and lateral stability to the track.

Signalling block systems: It enable the safe and efficient operation of railways by preventing collisions between trains.

7. Extensively used plate laying method in India is

(67/2014)

- A. Side method
- B. American method
- C. Telescopic method
- D. Group index method

Ans: C

Methods of plate laying are

Tram line method: In this method, a temporary line known as a tram line is laid by the side of the proposed track for transporting track material to the site.

This method can be useful in flat terrains, where laying of a tram line on the natural ground may be comparatively easier.

It is an old method

Side method: In this method track and bridge material are carried to the site in trucks on a service road that runs parallel to the track.

These materials are then unloaded near the work site.

This method is used only in cases where the terrain

is comparatively flat.

American method: In this method, rails and sleepers are first assembled in the base depot, and the pre-assembled track panels are then conveyed to the site along with the necessary cranes.

Telescopic method: This method is widely used on Indian Railways. In this method, the rails, sleepers, and other fittings are taken to the base depot and unloaded. The track material is then taken to the rail head, where the tracks linked and packed. The rail head is then advanced up to the point where the track has been laid. The track materials are then taken up to the extended rail head with the help of a dip lorry and the track is linked and packed again. Thus, the rail head goes on advancing till the entire track has been linked.

8. The longitudinal movement of the rails in a track due to various reasons (28/2020)

- A. Creeping of rails
- B. Derailment
- C. Lead rails
- D. Hogged rails

Ans: A

Refer question no. 4, Grade II.

9. Standard size of ballast for C.T.S.-9 and steel sleepers (034/2022)

- A. 20 mm
- B. 25 mm
- C. 40 mm
- D. 50 mm

Ans: C

Table 2.3 Types of sleeper and corresponding ballast size

Size of ballast	Types of sleeper
50mm	Wooden and CI sleeper
40mm	C.T.S.-9 and steel sleepers
25mm	points and crossing

10. The defect caused when the rail with its end or ends bent in vertical direction is called

(034/2022)

- A. Wear of rails
- B. Bending of rails
- C. Hogging of rails
- D. Creep of rails

Ans: C

Defects in Rails

Wear of rails: Flow of rail metal by abnormal heavy loads.

- India - permissible limit 5% by weight and is maximum at sharp curves.

- Allowable wear of 25% is exceptionally adopted.

Creep of rails: Refer question no.4, Grade II.

GRADE I

- 1. To prevent creep in rails, the steel sleepers are fixed with rails by clips, bolts and (332/2005)**

- A. One key B. Two keys
C. Three keys D. Four keys

Ans: D

The following table gives the number of fastenings required for a different type of sleepers

Table 2.3 Number of fastenings required for a different type of sleepers

Type of sleepers	Ordinary fastenings per sleeper	Number
Wooden	Dog spikes	8
	Screw spikes	8
	Keys for CI bearing plates	4
Concrete	No ordinary fastening	-
Steel trough	Anchor keys	4
	loose jaws	4

- 2. The standard dimensions of a wooden sleeper for a B.G railway track are (332/2005)**

- A. 274 cm x 25 cm x 13 cm
B. 183 cm x 20 cm x 11 cm
C. 152 cm x 15 cm x 10 cm
D. 175 cm x 20 cm x 12 cm

Ans: A

The standard size of wooden sleeper used in Broad gauge - 274cm x 25cm x 13cm
The standard size of wooden sleeper used in Meter gauge - 183cm x 20cm x 11cm
The standard size of wooden sleeper used in Narrow gauge - 150cm x 18cm x 9cm

- 3. The longitudinal movement of rails in a track (144/2007,27/2016)**

- A. Shift B. Creep
C. Cinders D. Ruling gradient

Ans: B

Refer question no. 4, Grade II.

- 4. Creep is the (160/2008,108/2010)**

- A. Lateral movement of rail
B. Vertical movement of rail
C. Longitudinal movement of rail
D. None of the above

Ans: C

Refer question no. 4, Grade II.

- 5. The process of filling ballast under and around the sleeper is called (164/2012)**

- A. Packing B. Boxing
C. Covering D. Filling

Ans: B

Boxing: Filling the ballast loosely around the sleepers is called boxing of ballast

Packing: Ramming the ballasts underneath the sleeper is known as Packing

- 6. Top of rails of a track are placed at an inward slope is (164/2012)**

- A. 1 in20 B. 1 in 25
C. 1 in 30 D. 1 in 10

Ans: A

Refer question no. 10, Grade III.

- 7. Rail chairs are used fix (151/2013)**

- A.Bull headed rails B.Single headed rails
C.Flat footed rails D.Double headed rails

Ans: A

Chair is used for bull headed and double headed rail. But in the case of flat foot rail bearing plate is used.

- 8. A sleeper is laid over (151/2013)**

- A.Ballast B.Formation
C.Rails D.None of the above

Ans: A

Refer question no. 6, Grade III.

- 9. Dog spikes are used for fixing rail to the (151/2013)**

- A.Concrete sleeper B.Steel sleeper
C.Wooden sleeper D.All the above

Ans: C

Dog Spike is a fastening which is used for fixing rails with wooden sleepers. The number of dog Spikes to be used depends on the locations. Its look like Dog shape and so named as dog Spike



Fig 2.6 Dog spike

10. The slope given in coning of wheel (036/2013)

- A. 1 in 15
- B. 1 in 25
- C. 1 in 10
- D. 1 in 20

Ans: D

Refer question no. 10, Grade III.

11. Wheels of a rolling stock are provided flanges on (66/2013)

- A. Outer side
- B. Inner side
- C. Both sides
- D. Neither side

Ans: B

The flanges of a railroad wheel are on the inside because it is easier to make a switch that operates on the inside flanges than on outside flanges. Switches could be made to operate with outside flanges but, they would be much more complicated and expensive.

12. Creep is (66/2013)

- A. Permanent elongation in the longitudinal direction
- B. Temporary elongation in the direction of motion
- C. Buckling of rails
- D. Skidding of the wheels

Ans: A

Refer question no. 4, Grade II.

13. Coning of wheels in locomotives to (76/2014)

- A. Prevent lateral movement of wheels
- B. Provide smooth running trains
- C. Avoid excessive wear of inner faces of rail
- D. All the above

Ans: D

Refer question no.1 , Grade III.

14. The function of ballast in railway track is to (76/2014)

- A. Facilitate drain age
- B. Provide the necessary resilience against dynamic effect
- C. Serve as an elastic support for the track structure loads
- D. All the above

Ans: D

Functions of ballast:

- Provide firm and level bedded foundation for sleepers and rails to rest
- Protect the surface of subgrade and form an elastic bed
- Transmit and distribute the load from sleepers to subgrade
- Helps to maintain correct track level
- Hold the sleepers in position during passage of trains
- Provide lateral stability to track

15. Common type of stone used as railway ballast is (41/2015)

- A. Basalt and Trap
- B. Marble
- C. Slate
- D. Sand Stone

Ans: A

Refer question no. 8, Grade III.

16. Best ballast contains stones varying in size from (155/2015)

- A. 1.5 cm to 3 cm
- B. 2.0 cm to 4 cm
- C. 2.0 cm to 5 cm
- D. 2.5 cm to 6 cm

Ans: C

- To ensure uniformity 50-mm ballasts have been adopted universally for all types of sleepers.

- Points and crossings are subjected to heavy blows of moving loads and required a higher degree of precision so small-sized 25-mm preferable because of its fineness for slight adjustments, better compaction, and increased frictional area of the ballast.
- So best ballast contains stones varying in size from 20 mm - 50 mm

17. The mass production of railway sleepers can be done with (64/2016)

- A. Hoyer system B. Magnet system
C. Gifford udall system D. None of these

Ans: A

Hoyer system or long line method of prestressing is used for large scale production of railway sleepers

18. The yards, which used to isolate goods wagons received from various centres in the order of station at which they are to be sent? (96/2016)

- A. Locomotive yards B. Marshalling yards
C. Passenger yards D. Goods yards

Ans: B

A yard is a system of tracks laid for specific purposes like storing of vehicles, making up trains, dispatch of vehicles, etc.

For convenience yards are classified as

- Passenger Yards
- Goods Yards
- Marshalling Yards
- Locomotive Yards
- Sick Yards

Marshalling Yard is a place where goods trains are received, sorted, reformed and dispatched.

Functions of marshalling yards are:

- Reception
- Sorting
- Departure

19. The rails are connected at their ends by means of (96/2016)

- A. Chairs and keys B. Fish-plates
C. Spikes D. Bearing-plates

Ans: B

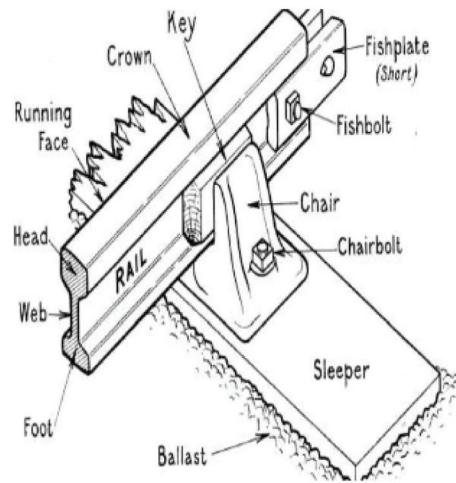


Fig 2.7 Component part of railway track

Fish plates: Fish plates are used in rail joints to maintain the continuity of the rails. These are manufactured of steel and are so designed that they fit in between the head and foot of the rail.

Bearing plates: Chairs used for flat footed rails are known as bearing plates, they increase the bearing area on the sleeper and thus decreases the loading intensity

Spikes: Used to fix rails to wooden sleepers. They are of following types a) Dog spikes, b) Screw spikes c) Round spikes d) Elastic spikes

Chairs: The rail chair is installed between the rail sleepers and the rails, fixed with screws, and locked with a steel key. The train passes on the track, and the chair distributes the load from the train from the rail to the railway sleeper

Keys: They are small tapered pieces of timber or steel to connect rails to chairs on metal sleepers.

20. The spikes used on high-speed trunk routes to obtain better life by resisting lateral thrust (96/2016)

- A. Standard spikes B. Screw spikes
C. Elastic spikes D. Dog spikes

Ans: B

Spikes are used to hold the rails to the wooden sleepers. They can be used with or without bearing plates below the rails. Types of spikes are

Dog spikes: Section of spike is square and lower end is blunt, pointed or chisel shaped. Which is used for fixing rails with wooden sleepers



Fig 2.8 Dog spikes

Screw spikes/coach screws: Holding power is double that of dog spike. The head is circular with square projection. The sides are tapered and provided with threads. It resists lateral thrust better than dog spike so it is used on high-speed trunk routes



Fig 2.9 Screw spikes

Elastic spikes: Steel spring and specially shaped head are provided in these spikes. These provide give a better grip with the foot of the rail and it results in reduced wear and tear of rail, less noise and less creep

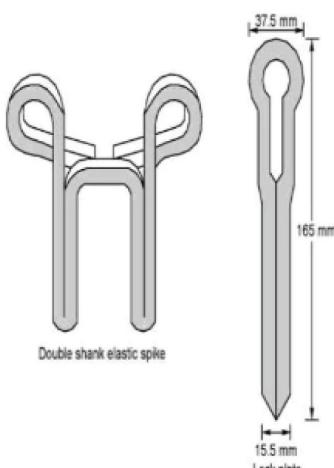


Fig 2.10 Elastic spikes

Round spikes: These spikes have blunt ends and length varies according to the gauge



Fig 2.11 Round spikes

21. The best type of ballast is (41/2017)

- A. Granite
- B. Sand stone
- C. Limestone
- D. Quartzite

Ans: D

Refer question no. 8, Grade III.

22. In Indian railways, the spikes used for holding flat footed rails on wooden sleepers are known as (41/2017)

- A. Dog spikes
- B. Screw spikes
- C. Round spikes
- D. Elastic spikes

Ans: A

Refer question no. 20, Grade I.

23. Stone generally referred for railway ballast is (143/2017)

- A. Marble
- B. Slate
- C. Basalt
- D. Sand stone

Ans: C

Refer question no. 8, Grade III.

24. The primary function of ballast in railway is to (143/2017)

- A. Maintain gauge
- B. Prevent growth of vegetation
- C. Irregularities in sleepers
- D. Provide elasticity

Ans: D

Refer question no. 3, Grade III.

25. The width of top portion of flat footed rail is (101/2021)

- A. 66.67 mm
- B. 69.80 mm
- C. 73.25 mm
- D. 75.88 mm

Ans: A

Flat footed rail:

- Head width- 66.7 mm
- Foot ,width - 136.5 mm
- Total height - 142.9 mm

Bull headed rails:

- Head width- 68.7 mm
- Foot ,width - 65.5 mm
- Total height - 145 mm

Double headed rails:

- Head and foot width-70 mm
- Total height - 152.5 mm

26. Which one of the following is used to fix flat

footed rails on wooden sleepers ?(101/2021)

- | | |
|------------------|--------------|
| A. Fish plate | B.Ballast |
| C. Bearing plate | D. Fish bolt |

Ans: C

Actual answer is Dog spike. But PSC the answer is bearing plate.
refer question no. 19 and 20, Grade I.

27. The granular material spread on the formation of a railway track for the sleeper to rest upon is known as (101/2021)

- | | |
|------------|------------------|
| A. Sleeper | B. Rail |
| C. Ballast | D. None of these |

Ans: C

Refer question no. 3, Grade II.