

**Note: 1) Questions in Bold are MANDATORY**  
**2) Draw figures in blank side of file page**  
**3) Don't attempt repeated questions**

| SR. NO. | QUESTIONS | YEAR | MARKS |
|---------|-----------|------|-------|
|---------|-----------|------|-------|

### HARBOUR ENGINEERING

#### Chapter-1 General (Attempt any 4 + Mandatory Questions)

|    |  |               |           |
|----|--|---------------|-----------|
| 1  | List major ports in India.   | NOV-19        | 03        |
| 2  | Write classification of harbour  | NOV-19        | 04        |
| 3  | What is the significance of water transportation?  | MAY-19        | 03        |
| 4  | <b>Discuss classification of harbour based on different criteria.</b>  | <b>MAY-19</b> | <b>07</b> |
| 5  | List major ports in India.   | NOV-18        | 03        |
| 6  | Write classification of harbour.   | NOV-18        | 04        |
| 7  | State advantages of water transport.   | MAY-18        | 03        |
| 8  | <b>What is the significance of water transportation? Discuss advantages and disadvantages of water transportation.</b> | <b>NOV-17</b> | <b>07</b> |
| 9  | Discuss classification of harbour based on different criteria.   | NOV-17        | 07        |
| 10 | <b>Enlist the major sea ports in India and in Gujarat. Also discuss any two in detail.</b>                             | <b>MAY-17</b> | <b>07</b> |
| 11 | What is the significance of water transportation compare to other modes of transportation? Explain in detail.          | OCT-16        | 07        |
| 12 | Describe the facilities required for a major port.   | OCT-16        | 07        |
| 13 | Discuss Inland Water Transport in India and National Waterways network.  | MAY-16        | 07        |

#### Chapter-2 Harbour Planning (Attempt Mandatory Questions Only)

|   |   |        |    |
|---|---|--------|----|
| 1 | Draw a neat layout of a harbour showing various components.   | NOV-19 | 04 |
| 2 | <b>What are the site selection criteria for harbour planning?</b>                                       | NOV-19 | 03 |
| 3 | What are the site selection criteria for harbour planning?  | NOV-18 | 03 |
| 4 | Sketch neat layout of harbour showing various components.   | NOV-18 | 04 |
| 5 | <b>What are the requirements of a good harbour?</b>   | MAY-18 | 03 |
| 6 | Draw the typical layout of a harbour showing all components.  | MAY-18 | 04 |
| 7 | Enlist the constituents of harbour. Draw the sketch of a typical artificial harbour.                    | MAY-17 | 07 |
| 8 | <b>Explain the major components of Harbour with neat diagram.</b>                                       | OCT-16 | 07 |
| 9 | Draw the schematic diagram of harbour layout showing all components and briefly write function of each. | MAY-16 | 07 |

#### Chapter-3 Natural Phenomena (Attempt any 3 + Mandatory Questions)

|   |   |               |           |
|---|---|---------------|-----------|
| 1 | Discuss about study of natural phenomena for harbour planning                                     | NOV-19        | 07        |
| 2 | Write a short note on littoral drift  | MAY-19        | 03        |
| 3 | <b>Discuss about study of natural phenomena for harbour planning.</b>                             | <b>NOV-18</b> | <b>07</b> |
| 4 | What do you mean by tides? Which are the types of tides?  | MAY-18        | 07        |
| 5 | Enlist various causes of beach erosion.   | MAY-18        | 03        |
| 6 | Write short note on littoral drift.   | NOV-17        | 04        |
| 7 | <b>How the water waves are generated? Explain by drawing sketch shallow waves and deep waves.</b> | <b>NOV-17</b> | <b>07</b> |
| 8 | Explain Littoral drift  | MAY-17        | 04        |
| 9 | <b>Define the following term.</b><br><b>1) Wave breaking 2) Wave reflection 3) Tidal range.</b>   | <b>OCT-16</b> | <b>07</b> |

|    |  |        |    |
|----|--|--------|----|
| 10 | Explain silting, erosion and littoral drift. | OCT-16 | 07 |
| 11 | Explain Causes of currents and its effects   | MAY-16 | 04 |

**Chapter-4 Marine Structures (Attempt any 15)**

|    |  |        |    |
|----|--|--------|----|
| 1  | What are the types of marine structures? Write functions of each.  | NOV-19 | 07 |
| 2  | What is breakwater? Write functions of it. Discuss about types of it   | NOV-19 | 07 |
| 3  | Distinguish between jetty & wharf  | MAY-19 | 03 |
| 4  | Compare mound type and wall type breakwaters   | MAY-19 | 03 |
| 5  | Enlist different types of dolphins. Explain any one  | MAY-19 | 04 |
| 6  | What is breakwater? Write functions of it. Discuss about types of it.  | NOV-18 | 07 |
| 7  | What are the types of marine structures? Write functions of each.  | NOV-18 | 07 |
| 8  | Differentiate between wharf and jetty.   | MAY-18 | 03 |
| 9  | Enlist different types of breakwater and describe composite breakwater with figure.                                | MAY-18 | 07 |
| 10 | Compare mound type and wall type breakwaters.  | NOV-17 | 03 |
| 11 | What is dolphin? Name different types of dolphins. Explain any one.  | NOV-17 | 04 |
| 12 | Distinguish between Jetty and Wharves.   | NOV-17 | 03 |
| 13 | What is break water? Give classification of break water and explain any one.                                       | MAY-17 | 07 |
| 14 | Distinguish between Jetty and wharves. State the conditions under which you will prefer their construction.        | MAY-17 | 07 |
| 15 | What are the different types of break water?   | OCT-16 | 07 |
| 16 | Explain the terms: I) Wharves & Fenders II) Quays & Jetties.   | OCT-16 | 07 |
| 17 | Define following terms (1) Fenders (2) Wharf (3) RO-RO ferry (4) Tetrapodes (5) Dredging (6) Mooring (7) Load line | MAY-16 | 07 |
| 18 | Write short notes on (1) Break water (2) Jetty   | MAY-16 | 07 |
| 19 | Write short notes on (1) Revetments (2) Groynes  | MAY-16 | 07 |
| 20 | Explain Fenders  | MAY-17 | 03 |

**Chapter-5 Docks and Locks (Attempt any 2 + Mandatory Questions)**

|           |   |               |           |
|-----------|---|---------------|-----------|
| <b>1</b>  | <b>What are the types of locks?</b>   | <b>NOV-19</b> | <b>03</b> |
| <b>2</b>  | <b>What are the types of docks?</b>   | <b>NOV-19</b> | <b>04</b> |
| 3         | What is floating dock? Give its advantages & disadvantages.   | MAY-19        | 07        |
| 4         | What are the types of locks?  | NOV-18        | 03        |
| 5         | What are the types of docks?  | NOV-18        | 04        |
| 6         | Explain floating dock with figure.  | MAY-18        | 04        |
| <b>7</b>  | <b>What are the different types of lock gates? Explain with sketch the mitre type gate and sector gate with a sketch of closed sector gate.</b> | <b>MAY-18</b> | <b>07</b> |
| 8         | Enlist different types of locks and explain any one.  | NOV-17        | 03        |
| <b>9</b>  | <b>What is floating dock? Give its advantages and disadvantages.</b>  | <b>NOV-17</b> | <b>07</b> |
| <b>10</b> | <b>Discuss the necessity of dry docks. Write advantages and disadvantages of floating dry docks.</b>  | <b>MAY-17</b> | <b>07</b> |
| 11        | Enlist different types of locks and explain any one.  | MAY-17        | 07        |
| 12        | Differentiate between dry dock and wet dock.  | OCT-16        | 07        |
| 13        | Differentiate between dry dock and wet dock.  | MAY-16        | 07        |

**Chapter-6 Port Amenities and Navigational Aids (Attempt any 4 + Mandatory Question)**

|   |  |        |    |
|---|--|--------|----|
| 1 | Discuss transit shed in brief  | MAY-19 | 03 |
| 2 | Discuss buoys, beacons and lighthouse.                               | MAY-19 | 07 |
| 3 | Explain about various navigational aids for waterway transportation. | NOV-18 | 07 |

|    |   |               |           |
|----|---|---------------|-----------|
| 4  | Explain floating landing stages.                                      | MAY-18        | 03        |
| 5  | <b>Draw the typical layouts of transit shade and warehouse shade.</b> | <b>MAY-18</b> | <b>04</b> |
| 6  | Write a short note on light house with figure.                        | MAY-18        | 07        |
| 7  | Discuss buoys, beacons and light house.                               | NOV-17        | 07        |
| 8  | What is transit sheds. Discuss in brief.                              | NOV-17        | 03        |
| 9  | Compare transit shed and warehouse.                                   | MAY-16        | 07        |
| 10 | Explain significance of Buoys and LORAN.                              | MAY-16        | 07        |

**Chapter-7 Harbour Maintenance (Attempt Mandatory Questions Only)**

|   |  |               |           |
|---|--|---------------|-----------|
| 1 | <b>What is the need of harbour maintenance? What are the methods of maintenance of harbour?</b>                | <b>NOV-19</b> | <b>07</b> |
| 2 | <b>What is dredging? Enlist the different types of dredgers and explain any one</b>                            | <b>MAY-19</b> | <b>07</b> |
| 3 | Discuss harbour maintenance  | MAY-19        | 03        |
| 4 | What is the need of harbour maintenance? What are the methods of maintenance of harbour?                       | NOV-18        | 07        |
| 5 | What is dredging? Which are the objectives of dredging?  | MAY-18        | 04        |
| 6 | Discuss harbour maintenance.   | NOV-17        | 04        |
| 7 | <b>What is dredging? Classify the different types of dredging works. List the different types of dredgers.</b> | <b>NOV-17</b> | <b>07</b> |
| 8 | Write short note on (i) Harbour maintenance (ii) Ship characteristics  | MAY-17        | 07        |

**AIRPORT ENGINEERING**

**Chapter-1 General (Attempt Mandatory Questions Only)**

|    |  |               |           |
|----|--|---------------|-----------|
| 1  | <b>Write airport classification as per ICAO</b>  | <b>NOV-19</b> | <b>04</b> |
| 2  | What is the role of ICAO?  | NOV-19        | 03        |
| 3  | <b>Enlist aircraft characteristics</b>   | <b>NOV-19</b> | <b>03</b> |
| 4  | <b>Explain different characteristics of an aircraft.</b>   | <b>MAY-19</b> | <b>04</b> |
| 5  | Describe aeroplane component parts with neat sketch  | MAY-19        | 04        |
| 6  | Enlist aircraft characteristics.   | NOV-18        | 03        |
| 7  | Explain different wheel configuration of aircraft with neat sketch.                                | NOV-18        | 04        |
| 8  | What is the role of ICAO?  | NOV-18        | 03        |
| 9  | Write airport classification as per ICAO.  | NOV-18        | 04        |
| 10 | Write short notes on ICAO and AAI.   | MAY-18        | 07        |
| 11 | Describe aeroplane component parts with neat sketch.   | NOV-17        | 04        |
| 12 | Explain different characteristics of an aircraft.  | NOV-17        | 03        |
| 13 | <b>Discuss in detail advantage and disadvantage of Air transportation.</b>                         | <b>OCT-16</b> | <b>07</b> |
| 14 | Describe aeroplane components part with neat sketch.   | OCT-16        | 07        |
| 15 | <b>Write a short note on International Civil Aviation Organization- ICAO.</b>                      | <b>OCT-16</b> | <b>07</b> |
| 16 | <b>Discuss the role of Airport Authority of India for functioning of Airports in India</b>         | <b>MAY-16</b> | <b>07</b> |
| 17 | <b>Draw the neat sketch of aircraft showing all components and briefly write function of each.</b> | <b>MAY-16</b> | <b>07</b> |

**Chapter-2 Airport Planning (Attempt Mandatory Questions Only)**

|   |   |               |           |
|---|---|---------------|-----------|
| 1 | <b>Discuss airport master planning process as per ICAO recommendations.</b> | <b>MAY-19</b> | <b>03</b> |
| 2 | <b>Define: Airport, Runway, Taxiway and Apron.</b>                          | <b>MAY-18</b> | <b>04</b> |
| 3 | Discuss airport master planning process as per ICAO recommendations.        | NOV-17        | 03        |
| 4 | Describe airport master planning process as per ICAO recommendations.       | MAY-17        | 07        |

**Chapter-3 Run Way Design (Attempt all questions)**

|    |   |        |    |
|----|---|--------|----|
| 1  | Sketch various orientation of runway with label   | NOV-19 | 04 |
| 2  | How runway orientation is decided?  | NOV-19 | 03 |
| 3  | The length of runway at sea level under standard condition at zero gradient is 1500m. the airport is at an elevation of 900m. The reference temperature is 20°C. Proposed runway permits ascending gradient of 0.5%. Determine final runway length.   | NOV-19 | 07 |
| 4  | Enlist and explain corrections to be applied to basic runway length.  | MAY-19 | 07 |
| 5  | Explain wind rose diagram showing direction, duration and intensity of wind.  | MAY-19 | 07 |
| 6  | Discuss basic patterns or configuration of the runways with neat sketches.  | MAY-19 | 07 |
| 7  | The length of runway at sea level under standard condition at zero gradients is 1500m. The airport site is at an elevation of 900m. The reference temperature is 20°C proposed runway permits ascending gradient of 0.5%. Determine final runway length.  | NOV-18 | 07 |
| 8  | How runway orientation is decided?  | NOV-18 | 03 |
| 9  | Sketch various orientation of runway with label.  | NOV-18 | 04 |
| 10 | Draw the typical layout of airport for single runway, two parallel Runways, three non-intersecting runways and tangential runways.  | MAY-18 | 07 |
| 11 | Determine the design length of runway required if the length under standard atmospheric conditions is 2000m, the actual elevation of the site is 1000m above MSL and the airport reference temperature is 16°C. Maximum effective gradient is 0.5%.   | MAY-18 | 07 |
| 12 | Discuss basic patterns or configuration of the runways with neat sketches.  | NOV-17 | 03 |
| 13 | Explain by drawing sketch wind rose diagram showing direction, duration and intensity of wind.  | NOV-17 | 07 |
| 14 | Describe the corrections to be applied to basic runway length.  | NOV-17 | 07 |
| 15 | Calculate the actual length of runway from the following data:<br>Airport elevation: R.L. 100 m<br>Airport reference temperature: 28 °C<br>Basic length of runway: 600 Highest point along the length: R.L. 98.2 m<br>Lowest point along the length: R.L. 95.2 m                                    | MAY-17 | 07 |
| 16 | Explain in detail wind rose diagram showing direction, duration and intensity of wind by drawing sketch.  | MAY-17 | 07 |
| 17 | What are the elements to be considered in the geometric design of runway?   | OCT-16 | 07 |
| 18 | Explain Wind rose diagram   | MAY-16 | 07 |
| 19 | The length of runway under standard conditions is 1000m. The airport site has an elevation of 308m. Its reference temperature is 20°C. If the runway is to be constructed with an effective gradient of 0.5%, determine the corrected runway length. Provide necessary check as per ICAO criterion. | MAY-16 | 07 |

**Chapter-4 Taxiway Design (Attempt Mandatory Questions Only)**

|   |  |        |    |
|---|--|--------|----|
| 1 | <b>Discuss parking system of aircraft on airfield. Draw neat sketches of various parking configuration of aircraft.</b>  | NOV-19 | 07 |
| 2 | Determine the turning radius of taxiway for an aircraft with a wheel base of 30m. tread of main loading gear is 6m. design turning speed is 50kmph. Width of taxiway pavement is 22.5m. Assume coefficient of friction between tyre and pavement surface as 0.13m. | NOV-19 | 07 |
| 3 | <b>Explain different wheel configuration of aircraft with neat sketch</b>  | NOV-19 | 04 |
| 4 | <b>What is the function of hanger? Explain the Nose hangers &amp; T Hangers with</b>   | MAY-19 | 04 |

|    |   |               |           |
|----|---|---------------|-----------|
|    | <b>neat sketch.</b>   |               |           |
| 5  | <b>Explain in brief: (1) Exit taxiway (2) Holding apron.</b>  | <b>MAY-19</b> | <b>04</b> |
| 6  | Explain aircraft parking systems with neat sketches.  | MAY-19        | 04        |
| 7  | <b>Determine the turning radius of taxiway for an aircraft with a wheel base of 30m. Tread of main landing gear is 6m. Design turning speed is 50kmph. Width of taxiway pavement is 22.5m. Assume coefficient of friction between tyre and pavement surface as 0.13m.</b> | <b>NOV-18</b> | <b>07</b> |
| 8  | Discuss parking system of aircraft on airfield. Draw neat sketches of various parking configuration of aircraft.  | NOV-18        | 07        |
| 9  | <b>What is clearway and stopway?</b>  | <b>MAY-18</b> | <b>03</b> |
| 10 | <b>Determine turning radius of taxiway if the speed of aircraft is 93km/hour and co-efficient of friction is 0.13.</b>  | <b>MAY-18</b> | <b>03</b> |
| 11 | Describe various aircraft parking systems with figures.   | MAY-18        | 07        |
| 12 | Explain aircraft parking systems with neat sketches with advantages and disadvantages.  | NOV-17        | 04        |
| 13 | Explain exit taxiway and holding apron.   | NOV-17        | 04        |
| 14 | <b>What is the function of a hanger? Explain the Nose hangers and T hangers with neat sketch.</b>   | <b>NOV-17</b> | <b>04</b> |
| 15 | What is the function of a hanger? Explain the Nose hangers and T hangers with neat sketch.  | MAY-17        | 07        |
| 16 | What is the function of taxiway in airport? Explain exit taxiway and holding apron.   | MAY-17        | 07        |
| 17 | What is the function of taxiway in airports? Draw cross section of taxiway showing all components.  | OCT-16        | 07        |
| 18 | <b>Explain the terms: I) Fuel storage area II) Holding apron</b>  | <b>OCT-16</b> | <b>07</b> |
| 19 | <b>Define (1) Stopway (2) RESA (3) Hanger (4) ATC (5) Taxiway (6) Apron (7) Threshold</b>   | <b>MAY-16</b> | <b>07</b> |

#### Chapter-5 Terminal Area Design (Attempt Mandatory Questions Only)

|   |   |               |           |
|---|---|---------------|-----------|
| 1 | Which facilities are provided in terminal area?   | NOV-19        | 07        |
| 2 | What are the facilities provided in terminal building? Also draw typical layout of airport terminal building.   | MAY-19        | 07        |
| 3 | Which facilities are provided in terminal area?   | NOV-18        | 07        |
| 4 | Which are the facilities required at terminal building?   | MAY-18        | 04        |
| 5 | <b>Draw a typical layout of a small domestic terminal building.</b>   | <b>MAY-18</b> | <b>04</b> |
| 6 | <b>What do you understand by terminal building? What are the facilities provided in terminal building? Also draw typical layout of airport terminal building.</b> | <b>NOV-17</b> | <b>07</b> |
| 7 | What are the purposes of airport terminal building? Draw layout of airport terminal building.   | MAY-17        | 07        |
| 8 | What are the facilities required at terminal building?  | OCT-16        | 07        |
| 9 | <b>Explain planning concept of terminal building by drawing sketches</b>  | <b>MAY-16</b> | <b>07</b> |

#### Chapter-6 Grading And Drainage (Attempt Mandatory Questions Only)

|   |  |               |           |
|---|--|---------------|-----------|
| 1 | <b>Write in brief about airport drainage system.</b>   | <b>NOV-19</b> | <b>04</b> |
| 2 | What is importance of airport grading?                 | NOV-19        | 03        |
| 3 | Discuss importance of grading and drainage in airport. | MAY-19        | 03        |
| 4 | What is importance of airport grading?                 | NOV-18        | 03        |

|    |  |               |           |
|----|--|---------------|-----------|
| 5  | Write in brief about airport drainage system.  | NOV-18        | 04        |
| 6  | What is airport grading? What is its importance?   | MAY-18        | 03        |
| 7  | Which are the aims and functions of airport drainage?  | MAY-18        | 04        |
| 8  | Discuss importance of grading and drainage in airport.   | NOV-17        | 03        |
| 9  | <b>Discuss importance of grading and drainage in Airport. Explain general requirements of grading.</b> | <b>MAY-17</b> | <b>07</b> |
| 10 | Explain the necessity of airport drainage. What are its special characteristics?                       | OCT-16        | 07        |

**Chapter-7 Air Traffic Control and Visual Aids (Attempt Mandatory Questions Only)**

|    |   |               |           |
|----|---|---------------|-----------|
| 1  | <b>Write in brief about types of airport lightings with their purpose of provision.</b> | <b>NOV-19</b> | <b>03</b> |
| 2  | Write in brief about types of airport markings with their function.                     | NOV-19        | 04        |
| 3  | Write a short note on visual aids & runway lighting                                     | MAY-19        | 04        |
| 4  | Write in brief about types of airport lightings with their purpose of provision.        | NOV-18        | 03        |
| 5  | <b>Write in brief about types of airport markings with their function.</b>              | <b>NOV-18</b> | <b>04</b> |
| 6  | <b>Write a short note on runway lighting and visual aids.</b>                           | <b>MAY-18</b> | <b>07</b> |
| 7  | Write a note on visual aids and runway lighting.  | NOV-17        | 04        |
| 8  | Write a short note on runway lighting and visual aids.                                  | MAY-17        | 07        |
| 9  | <b>Describe various components of air traffic control network.</b>                      | <b>OCT-16</b> | <b>07</b> |
| 10 | <b>Write short notes on (1) Localiser (2) Glide slope antenna.</b>                      | <b>MAY-16</b> | <b>07</b> |