

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024****Subject Code: 3174022****Date: 01-06-2024****Subject Name: Airport and Seaport Engineering****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1** (a) Define: Harbour, Dock, Port. **03**
 (b) Describe the requirements of a good seaport. **04**
 (c) Discuss the factors affecting while selecting the location of exit taxiway. **07**
 Determine the (i) Radius of central curve, (ii) Length of entrance curve, (iii) Stopping distance, for the Exit Taxiway joining a runway and a parallel main taxiway. Take turn off speed of an aircraft is 95 kmph, coefficient of friction between tire and pavement is $f = 0.15$, coefficient $C = 0.39$, and deceleration rate = 1 m/sec^2 .

- Q.2** (a) Define for a ship: NRT, DWT, Stern. **03**
 (b) Briefly describe with sketch: Three controls of an aircraft. **04**
 (c) Compute the corrected runway length for: Runway length at sea-level, std. atmospheric pressure, temperature and zero gradient = 1650 m, Site elevation = 450 m from MSL, ART = 21°C , effective gradient = 0.14 %. **07**

OR

- (c) Design the dimensions of a general cargo berth for 3 ships, berthed in series on a wharf as per the IS provisions. Assume LOA = 310 m, and beam = 32 m of the design ship. Draw the scaled sketch and show all components. **07**

- Q.3** (a) Define: (i) Cross wind component, (ii) Wind coverage, (iii) Maximum structural landing weight of an aircraft. **03**
 (b) Discuss with sketches "Approach zone profile for ILS runway". **04**
 (c) Explain the procedure to determine the orientation of a runway using Type-2 Windrose diagram. **07**

Draw the Type-I Wind-rose diagram from the given data and suggest the direction for the runway orientation:

Direction	Duration %	Direction	Duration %	Direction	Duration %	Direction	Duration %
N	4.3	E	3.8	S	6.8	W	6.3
NNE	6.2	ESE	1.7	SSW	11.2	WNW	5.7
NE	9.5	SE	2.5	SW	14.5	NW	4.6
ENE	6.8	SSE	1.8	WSW	9.3	NNW	3.2

OR

- Q.3** (a) Define: (i) Littoral drift, (ii) Spring tide, (iii) Bores. **03**
 (b) Describe with sketches causes and types of Tides. Also, discuss the impacts of tides on marine structure design. **04**

- (c) If length of design vessel is 250 m, beam is 25 m, and loaded draft is 10 m, determine following as per the IS provisions: (i) Stopping distance in the entrance channel when vessel in ballast, (ii) Bottom width of one lane channel-draw sketch, (iii) Diameter of Turning basin with tug assistance, (iv) Depth of harbour basin, (v) Minimum length and width of berthing area, (vi) Minimum width of harbour entrance, (vii) Depth of entrance channel. **07**
- Q.4** (a) Define: Fenders, Breakwater, Dry dock. **03**
 (b) Describe with sketches construction of mound type breakwater. **04**
 (c) Draw the detailed cross-section of typical dock wall. Explain the various design loads and aspects of its construction. **07**
- OR**
- Q.4** (a) Define: Airport capacity, Taxiway, Hangar. **03**
 (b) Discuss the factors which are affecting the airport operating capacity. Explain with the sketches, different types of runway configurations and state their operating capacity. **04**
 (c) Explain “Air Traffic Control”, its needs, primary functions, and working of air traffic control network. **07**
- Q.5** (a) Define: VFR, Airway beacon, Threshold markings. **03**
 (b) Briefly explain with sketches ‘Holding Apron’ of airport. **04**
 (c) Explain with sketches: Runway markings and lightings. **07**
- OR**
- Q.5** (a) Define: Slip, Apron, Transit shed. **03**
 (b) Briefly discuss the necessity of dredging in harbour area. Explain with sketches working of ‘Grab Dredger’. **04**
 (c) Explain with sketches: (i) Light house, (ii) Entrance Lock with Gates. **07**
