Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3174022 Date: 19/06/2023

Subject Name: Airport and Seaport Engineering

Time: 10:30 AM TO 01:00 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, Break water, Wharf. **03**

(b) What are the requirements of good seaport with harbour? **04**

(c) Compute the corrected runway length for: Runway length at sea-level, std. atmospheric pressure, temperature and zero gradient = 1600 m, Site elevation = 720 m from MSL, ART = 20^{o} C, effective gradient = 0.16 % **07**

Q.2 **(a)** Define: NRT, DWT, Keel **03**

(b) Briefly describe with sketch: (i) Three controls of an aircraft, (ii) Turbojet engine. **04**

(c) If length of design vessel is 300 m and beam is 35 m, determine following as per the IS provisions: (i) Stopping distance in the entrance channel when vessel is fully loaded, (ii) Bottom width of 2 lane channel-draw sketch, (iii) Diameter of Turning basin without tug assistance. **07**

OR

(c) 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 90 kmph, coefficient of friction between tire and pavement is f = 0.15, coefficient C = 0.39, and deceleration rate = 1 m/sec^2. **07**

Q.3 **(a)** Define: (i) Cross wind component, (ii) Wind coverage, (iii) Empty operating weight. **03**

(b) Discuss the factors affecting while the airport site selection. **04**

(c) Design the dimensions of a general cargo berth for 2 ships, each on either side of a pier as per the IS provisions. Assume LOA = 280 m, and beam = 30 m of the design ship. Draw the scaled sketch and show all components. **07**

OR

Q.3 **(a)** Define: (i) Littoral drift, (ii) Spring tide, (iii) Bores. **03**

(b) Explain with sketch effect of sea waves on marine structures. **04**

(c) Draw the Type-I Wind-rose diagram from the given data and suggest the direction for the runway orientation: **07**

Direction	Duration %	Direction	Duration %	Direction	Duration %	Direction	Duration %
N	1.4	E	6.5	S	6.3	W	4.1
NNE	1.9	ESE	11.8	SSW	5.4	WNW	6.3
NE	2.2	SE	14.7	SW	5.7	NW	8.8
ENE	1.3	SSE	9.8	WSW	3.2	NNW	3.4

Q.4	**(a)**	Show the components in a detailed C/S sketch of typical Runway.	**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 with sketch "Graving Dock", its operation and construction.	**07**
		OR	
Q.4	**(a)**	Draw the typical C/S of mound with super structure founded at low water level.	**03**
	(b)	Describe with sketches: (i) Fenders, (ii) Dolphin piles	**04**
	(c)	Explain "Air Traffic Control Aids".	**07**
Q.5	**(a)**	Define: (i) Taxiway, (ii) Fillets, (iii) Holding apron	**03**
	(b)	Briefly describe importance of airport grading and drainage.	**04**
	(c)	Explain with sketches: (i) Light house, (ii) Hydraulic/suction dredger.	**07**
		OR	
Q.5	**(a)**	Draw the detailed top view of Entrance Lock with Gates and show the components.	**03**
	(b)	Briefly describe different ancillaries used for the port operation.	**04**
	(c)	Explain with sketches: (i) Runway markings, (ii) Taxiway lightings.	**07**

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