

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**FIRST SEMESTER 2022 - 2023**

**AIRPORT PLANNING & DESIGN - Comprehensive Exam - Regular**

**Course No: CE G545**

**Date: 26-12-2022 [2:00 PM start]**

**Duration: 90 Mins (Closed book)**

**Max. Marks: 30**

**Note: There is no strict time limit between closed book and open book. You may decide accordingly depending on the level of questions.**

**I: Choose the best answers**

**[10 x 1 = 10 marks]**

- 1) IDF stands for \_\_\_\_\_ (hint: drainage design)
- 2) As per ACDM, TOBT stands for \_\_\_\_\_
- 3) Time series forecasting treats the system as a 'black box' and does not attempt to discover the factors affecting demand (True/False)
- 4) The weight of the undrainable oil is part of the empty weight of the aircraft (True/False)
- 5) \_\_\_\_\_ is the height above the ground or water of the base of the lowest layer of cloud.
- 6) A key indicator for runway capacity is \_\_\_\_\_
- 7) The runway is usually oriented in the direction of the prevailing winds (True/False)
- 8) According to the FAA standards (FAA AC 150/5300-13), the minimum wind coverage considering all the observations is \_\_\_\_\_
- 9) In runway layout, 12/30 represents \_\_\_\_\_
- 10) The absolute minimum turning radius for supersonic aircrafts irrespective of any speed is \_\_\_\_\_

**II: Short answers**

**[10 x 2 = 20 marks]**

- 1) Mention the assumptions of rational method.
- 2) What are the factors affecting the inlet interception capacity and efficiency?
- 3) What are the advantages and disadvantages of grate inlets?
- 4) What are the components of airport?
- 5) Mention the pre-departure sequencing process.
- 6) How do you calculate the actual taxi-in time?
- 7) Define fuselage
- 8) What are the advantages of angled nose-in and angled nose-out parking?
- 9) What are the typical rigid pavement failures?
- 10) Define calm period.

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**FIRST SEMESTER 2022 - 2023**

**AIRPORT PLANNING & DESIGN - Comprehensive Exam - Regular**

**Course No: CE G545**

**Date: 26-12-2022 [2:00 PM start]**

**Duration: 90 Mins (Open book)**

**Max. Marks: 40**

**Note: All question carries equal marks -**

1) Explain the step by step procedure to determine the equivalent coverages for rigid pavement design.

2 a) The following data refers to the proposed longitudinal section of runway. [7 marks]

End to end of runway	Gradient
0.0 to 10.0 chains	+ 1.0 %
10.0 to 15.0 chains	- 1.0%
15.0 to 40.0 chains	+ 0.8 %
40.0 to 50.0 chains	+ 0.2 %

One metric chain length = 20 m; Determine the effective gradient of runway. The elevation (Reduced Level) corresponding to zero chainage is 100.0

2 b) Why should longitudinal gradient vary according to type of airports? [3 marks]

3 a) The monthly mean temperatures of the atmosphere, at a particular site, where an airport has to be developed, are given below. Determine the airport reference temperature. If the site is at mean sea level, determine the actual runway length. The runway is assumed to be level. [5 marks]

Month	Temperature - Mean value of average daily Temperature (T1)	Temperature – Mean value of Maximum daily Temperature (T2)
January	3	5
February	15	17
March	20	23
April	25	32
May	37	45
June	35	50
July	32	37
August	30	35
September	27	31

October	22	28
November	12	18
December	6	9

3 b) What are the environmental factors that influences the runway pavement length and also the aircraft performance? [ 5 marks]

4) Briefly highlight the broader facilities with respect to airport planning & design for the new greenfield airport to be located at tier 1 city.

Annual passengers to be served – 50 MPPA; Expected LoS – B; Type of passengers – 40% - Tourist; 60% - Business travelers

Good number of airliners are ready to serve this airport. Reasonably good sizable land is available and land acquisition is not a problem. The surrounding of the airport has excellent environment to support tourist and business travelers.

**The minimum number of facilities to be highlighted should be 10 (along with reasoning). Each reasoning carries 1 mark. Calculations are not required. Innovative and intuitive reasoning will fetch more marks.**

**Hint: For example, runway provided is this much length/orientation stating these reasons. Like this, you are required to highlight 10 key features with reasoning.**