Code : 011834

B.Tech 8th Semester Exam., 2020

AIRPORT PLANNING AND DESIGN

Time : 3 hours *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Choose the correct answer of the following (any *seven*) : 2×7=14

(a) The head wind is the direction of wind

(i) similar to the direction of landing and takeoff

(ii) opposite to the direction of landing and takeoff

(iii) which does not depend on direction of landing and takeoff

(iv) flowing with standard temperature of 15 °C

(Turn Over)

(b) Normal landing cases required that aircraft should come to a stop

(i) within 60% of landing distance

(ii) within 40% of landing distance

(iii) within 70% of landing distance

(iv) Does not depend on landing distance

(c) Total correction for elevation plus temperature is

(i) 35% of basic runway length

(ii) 40% of basic runway length

(iii) 25% of basic runway length

(iv) 40% of runway length

(d) According to the ICAO, all markings on the runway length is

(i) yellow

(ii) white

(iii) black

(iv) red

(e) Longitudinal gradient should not

(i) exceed 2·5% for *a* and *b* and 5% for other types

(ii) exceed 1·5% for *a* and *b* and 3% for other types

(iii) exceed 3·5% for *a* and *b* and 2% for other types

(iv) None of the above

(f) Runway saturation is defined as

(i) when runway loaded to full capacity

(ii) when runway tends to loading of partial capacity

(iii) it does not depend on loading capacity

(iv) None of the above

(g) The size of holding apron depends on

(i) peak hour aircraft movement

(ii) aircraft size

(iii) ground maneuvering characteristics

(iv) All of the above

(h) According to the ICAO, the radius of fillet

(i) should not be more than the width of taxiway

(ii) should not be less than the width of taxiway

(iii) does not depend on width of taxiway

(iv) None of the above

(i) The main disadvantage of angle nose out parking configuration of aircraft is that the

(i) aircraft rear loading door is far away from terminal building

(ii) hot blast is directed towards the terminal building

(iii) overall apron area required is more

(iv) All of the above

(j) The minimum width of clearway is

(i) 50 m

(ii) 100 m

(iii) 150 m

(iv) 250 m

2. (a) What are the different types of aircraft propulsion? Discuss each type. 7

(b) Enumerate the various factors which you would keep in view while selecting a suitable site for an airport. 7

3. (a) Classify the cases that are to be considered in deciding the basic runway length. 6

(b) Write short notes on the following : 8

(i) Zoning Laws

(ii) Clear Zone

(iii) Approach Zone

(iv) Approach Surface

4. (a) Explain the necessity of airport classification. Give different systems of classification of airports. 8

(b) In the grading operations for runway, it is proposed to have a rising gradient of 0·5% meeting a falling gradient of 0·7%. There is again an upgrade of 0·40%. Determine the length of vertical curves and the distance between grade changes of runway. Assume that the runway is required to handle jet aircrart. 6

5. (a) Explain the various factors which affect the location of exit taxiway. What do you understand by optimum location of exit taxiway? 7

(b) What are the different parking configurations for an aircraft? Explain the merits and demerits of each method of parking. 7

6. (a) What are the design considerations for a taxiway lighting? 7

(b) Distinguish between terminal apron and cargo apron. 7

7. (a) Define the term 'gate capacity'. Explain the factors on which the gate occupancy time depends. 7

(b) What are the different methods adopted for air travel demand forecasting? 7

8. (a) Explain, with neat sketch, the typical layout of airport based on runway configuration. 6

(b) An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperatures for the hottest month at the site are 40 degree and 28 degree centigrade respectively. The effective gradient is 0·18%. Determine the length of the runway required at the proposed site if the basic runway length is 1900 m. 8

9. (a) Calculate the actual length of runway from the following data : 8

1. Airport elevation = RL 100
2. Mean of average daily temperature = 32 °C
3. Mean of maximum daily temperature = 36 °C
4. Highest point along the length = RL 99·5
5. Lowest point along the length = RL 97·5
6. Basic runway length L = 600 m

(b) Explain wind coverage and crosswind components. Draw the sketch showing aeroplane components. 6

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