

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

EndTerm Examination (Regular/Backlog), November-December2015

B. Tech/M. Tech (as applicable) in Civil Engineering, Semester VII

Roll No.....

CE729:Advanced Transportaion Engineering

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1 Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. Length of a runway in standard atmospheric conditions is 1800 m. if the actual reduced level of the site is 1200 m, the design length of the runway is.
(a) 2360 m (b) 2460 m (c) 2560 m (d) 2660 m
- ii. Two single runways on an Airport can be arranged in the form of
(a) T shape (b) L Shape (c) X shape (d) Any of the above
- iii. Which of the following is not matched correctly?
(a) Runway lighting-white (b) Threshold lighting-Yellow
(c) Taxiway lighting-Blue (d) End threshold lighting- Red
- iv. A narrow gauge floor lighting of runways
(a) Completely eliminates black hole effect (b) Partially eliminates black hole effect
(c) is obsolete (d) is used to light up the takeoff portions of runways
- v. The meteorological condition which influences the size and location of an airport is
(a) Atmospheric pressure (b) Wind direction
(c) Reduced level (d) All the above
- vi. According to the railway board the limiting value of cant is.
(a) $G/5$ (b) $G/10$ (c) $G/15$ (d) None of the above Where G is Gauge
- vii. Degree of railway curve is defined as number of degrees subtended at the center of a curve by an arc of
(a) 15.5 m (b) 20.0 m (c) 30.5 m (d) 35 m
- viii. Creep is greater
(a) On curves (b) In new rails than in old rails
(c) Both a & b above (d) None of the above
- ix. Maximum degree of curvature for meter gauge is limited to
(a) 10 degree (b) 16 degree (c) 30 degree (d) 40 degree
- x. The minimum spacing in between two adjoining railway tracks in B.G in station limits should be
(a) 4.27 m (b) 4.73 m (c) 3.35 m (d) 1.67 m

- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- i Sketch a typical layout of an airport showing location of two parallel runways, taxiways, apron and terminal building etc
- ii Differentiate among short welded rails (SWR), long welded rails(LWR), and continuously welded rails(CWR)
- iii Define Permanent way and discuss main requirements of an ideal permanent way
- iv Differentiate between a runway and a taxiway
- Q.3A Why are signals required along a railway track line? Discuss different types of signals. 05
- Q.3B Enumerate various factors which influence location of an airport. Discuss in detail any three. 05
- Q.4A Find out the design length of a runway required if the length under standard atmospheric conditions is 1500m, the actual elevation of site is 1100m above MSL and the aerodrome reference temperature is 16 degree centigrade. Maximum effective gradient may be taken as 0.04%. 05
- Q.4B Illustrate with neat sketches a right hand and left hand turn out and explain their working principles. 05
- Q.5A What are various elements of geometric designs of a runway? Specify the standards stipulated by ICAO for each one of them. 05
- Q.5B Explain with reference to airport lighting 05
- (a) Threshold lights
- (b) Runway boundary lights.
- Q.6A Describe the two basic types of flight rules. 05
- Q.6B Explain the following with neat sketches 05
1. Turn table 2 Diamond crossings
- OR
- Q.6B Enumerate various types of horizontal and vertical curves in railway geometric design. Define. with a neat sketch one horizontal and one vertical curve 05
- Q.7A An airport has four gates which are available for all the aircraft .It serves 3 classes of aircraft having mix and average occupancy time during peak hour is as following 05
- | Aircraft class | Mix percentage | Average occupancy time in minutes |
|----------------|----------------|-----------------------------------|
| 1 | 35 | 60 |
| 2 | 55 | 45 |
| 3 | 10 | 30 |
- If the maximum gate utilization factor is 70% find the capacity of the gates at this airport to process the aircraft.
- Q.7B Find the gradient for a broad gauge track such that the grade resistance together with curve resistance due to curve of 2 degree shall be equal to the resistance due to a ruling gradient of 1 in 200. 05

OR

- Q.7B Design a diamond crossing between two BG tracks crossing each other at an angle of 1 in 10 05
- Q.8 Illustrate with neat sketches functions, types and principles of Marshalling yards. 10
- Q.9A Explain with neat sketches, the layout of various stations indicating passenger facilities provided at stations. Also enumerate considerations for site selection for railway stations and yards 7+3
- Q.9B Following is the average wind data for 12 years when wind velocity is above 6KPH. An airport is to be designed for two runways. Determine the best runway orientation and calculate total wind coverage; 10

Wind direction	Percentage of time	Wind direction	Percentage of time
N	6.20	S	7.40
NNE	10.0	SSW	14.20
NE	8.20	SW	10.00
ENE	4.00	WSW	6.00
E	2.00	W	4.20
ESE	0.80	WNW	0.40
SE	0.70	NW	0.20
SSE	4.00	NNW	4.60

OR

- Q.9B Calculate the materials required to construct one kilometer long broad gauge railway track. Data given is: 10
- BG rail length = 12.8m
- Weight of rail = 44.7kg/m
- Density factor $x=4$

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