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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-2 Examination, April 2016

M.Tech. (CM) 2nd Semester and B.Tech. (Civil) 8th Semester

Course Code: **10M11CE212** MAX. MARKS: 25

COURSE NAME: Heavy/Civil Construction Equipment, Methods and Management

COURSE CREDITS: 04 MAX. TIME: 1 Hr. 30 Mins.

NOTE: All questions are compulsory. Marks are indicated against questions.
Use of mobile phones is strictly prohibited and will be treated as unfair means.

Q.1. Why is the Warm Mix Asphalt (WMA) getting popular over the Hot Mix Asphalt (HMA)? Give its benefits and support your answer with a table showing percentage reduction in different pollutants. [4]

Q.2. What are the functions of organic and chemical additives used in preparation of Warm Mix Asphalt (WMA)? Give names of additives also. [4]

Q.3. What are the constraints considered in Peurifoy's method of optimizing productivity of civil heavy equipments? [4]

Q.4. A belt conveyor has a theoretical productivity of 2000 tons per hour. The time to accelerate to operating speed is 0.1 min. Construct a simplified load growth curve for this machine. [4]

Q.5. Given a haul length of 1300 feet, a loading time (L) of 3 minutes, a variable time (V) of 4 minutes, compute the sustained cycle time, the optimum number of hauling units (N), and sustained production rate. The hauler has a capacity of 20 bank cubic yards (BCY). The shift is 8-hour long and waste time (W) is 2 minutes per cycle. [4]

Q.6. A ready-mix concrete (RMC) company is going to replace its fleet of mixer trucks and seeking to select the optimum number of trucks in relation to the service rate of its batch plant and the rate at which orders are received. The concrete batch plant loads mixer trucks with a maximum capacity of 12 cubic yards. Orders are filled on a first come, first served basis, and are received on a random basis throughout the day. Some orders are placed in advance (i.e., scheduled), but the time of day at which concrete is required on an advance order is sufficiently spread across the course of an average day that all orders can be assumed to be random and conform to a Poisson distribution. On an average day, the company will fill orders totaling 480 cubic yards of concrete with the average load of 9 cubic yards. The batch plant can discharge concrete into the mixer trucks at a rate of 2 cubic yards per minute. The total ownership and operating cost of the batch plant including labor and overhead is $1500/h. The same cost for the trucks is $80/h. Considering the batch plant as the loading facility, model this situation as a *single channel queuing problem* with $N' = 1$. Also determine the optimum number of trucks (N) thereafter. [5]

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