M.E. Second Semester (Civil Engineering (Construction Engg. & Managt.)) (CGS)
13072 : Construction Equipment & Machinery Management : 2 CM 01

P. Pages : 2

Time : Three Hours

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Max. Marks : 80

Notes : 1. All question carry equal marks.
2. Illustrate your answer necessary with the help of neat sketches.
3. Solve **any five.**

1. Solve **any two.**

a) What are various methods of calculating depreciation of an equipment. A piece of an equipment is to be purchased for Rs. 10 lakhs has an estimated useful life of 5 years with a salvage value of Rs. 2500. Determine the depreciation and the book value for each of the 5 years using straight line method. — **8**

b) What are the factors to be considered for replacement analysis of equipment? Why and when equipment is to be replaced. — **8**

c) A machine costs Rs. 20 lakhs. Fuel, Oil, Grease and Minor maintenance are estimated to cost Rs. 800 per opening hour. A set of tyres cost Rs. 1,60,000 to replace and their estimated life is 2500 use hours. A Rs. 1.80 lakhs major repair will probably be required after 4200 hours of use. The machine is expected to last for 8000 hours, after which it will be sold at a price (salvage value) equal to 10% of the original purchase price. A final set of new tyres will not be purchased before sale. How much should be the owner of the machine charge per hour of use, if its expected that the machine will operate 1400 hour per year. The company's cost of capital rate is 7%. — **8**

2. Solve **any two.**

a) Explain the methods indicating the compacting ability of pneumatic rollers. — **8**

b) Explain, how planning of earthwork construction features are shown using three views in graphical representation. — **8**

c) Explain the method of soil stabilization and its effect in handing the earthwork. — **8**

3. Solve **any two.**

a) Explain various pile hammers used for driving the pile? Enlist factors while selecting method of driving piles. — **8**

b) A track type dozer equipped with a power shift can push an average blade load of 6.15 lcy. The material being pushed is silty sand. The average push distance is 90 ft. Calculate the expected production in loose cubic yard (lcy).
Take. Avg Speed = 2 mph (Push time)
= 4 mph (Return time) — **8**

c) Discuss about Scraper Production Cycle. — **8**

4.   Solve **any two.**

    a)   An off-highway truck weighs 70000 lb empty and 1,50,000 lb when loaded. The   8
          weight distribution loaded is 33% front and 67% rear. The truck has two front tyres
          and four rear tyres. The truck works an 8 hr shift hauling rock to a crusher. The one-
          way haul distance is 5.5 miles. The truck can make 14 trips per day. Calculate the job
          TMPH value for the truck (Tons – miles – per – hour).

    b)   Explain basic parts of cable operated hoe, differentiate it with respect to shovel.   8

    c)   A shovel with a 3-cy heaped capacity bucket is loading well – blashed rock on a   8
          highway project. The average face height is expected to be 22 ft. The shovel has a
          maximum rated digging height of 30 ft. Most of the cut will require a 140° swing of
          the shovel to load the haul units. What is the conservative production estimate in bank
          cubic yards?

5.   Solve **any two.**

    a)   Discuss the advantages and disadvantages of crawler cranes.   8

    b)   Which are the component parts of Tower Crane? Draw the sketch and explain its   8
          operation.

    c)   Discuss the effect of boom on efficiency of crane.   8

6.   Solve **any two.**

    a)   An asphalt plant can produce 350 tph. A project requires paving individual 12ft lanes   8
          with 2 – in lift. Averaging 112 lb/sy-in. What average paver speed will match the plant
          production? How much 18 ton bottom – dump trucks will be required if the total haul
          cycle time is 55 min?

    b)   Explain the methods of asphalt storage and heating.   8

    c)   Discuss regarding working operation for placement of concrete using concrete pumps.   8

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