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# TUTOR MARKED ASSIGNMENT

## ET 204 (Part B)

### ENGINEERING MATERIALS

**Maximum Marks : 100** **Course Code : ET-204B**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Engineering Materials.

Q.1 Explain the process of manufacturing of cement in detail? What are the raw materials and discuss their role in manufacturing of cement?

Q.2 (a) Explain the reasons for precautions to be taken while laying granolithic floor. Explain why it is to be taken.

(b) Mention the various applications of following cements with your own reasons for their applications.

(i) Super Sulphate Cement

(ii) Low Heat Cement

(iii) Rapid Hardening Cement

(iv) Expansive Cement

Q.3 (a) Explain the chemical composition of OPC, with their role in hydraulic of cement.

(b) What is Tar? Explain the different grades of tar with their applications with justification.

Q.4 Explain the role of Bitumen as a water proofing materials. List the Bitumen products available in market with their advantage.

Q.5 (a) Discuss the role of polymer modified mortars for repair and maintenance. Explain its process of application.

(b) Explain bonding agents with their properties and field applications with their proper emission procedure in field.

Q.6 (a) What is Fibre Reinforced Concrete? Discuss their properties and applications in the field with your proper reasoning.

(b) What is foam and airated concrete. How is it manufactured. What are their advantages and disadvantages?

Q.7 (a) What are different concrete finishes? Discuss in detail with their applications with your explanation.

(b) Discuss different types of Epoxy Resins Flooring. Describe them in detail with their field applications and advantages and disadvantages.

Q.8 (a) Discuss various types of paints with their applications procedure and advantages and disadvantages for civil structures.

(b) What is Fibre Reinforced concrete? Discuss its advantages and applications.

Q.9 (a) Explain the working mechanism of Admixture. Discuss the commonly available admixtures in your market. Explain their advantages with your reasoning.

(b) What is FRP? Explain its advantages and its applications.

Q.10 Write Short notes on :

(a) PVC Doors and Windows

(b) MDF

(c) Plastic Sections

(d) Circuit Brakers.

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# TUTOR MARKED ASSIGNMENT

## ET 505

## TRANSPORTATION AND TRAFFIC ENGINEERING

**Maximum Marks : 100** **Course Code : ET-505**
**Weightage : 30%** **Last Date of Submission : July 31, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Transportation and Traffic Engineering.

Q.1 Outline the role of transport (road, rail, river, and air) in the development of Indian economy and society since 1947. Collect the relevant data from authorised sources/publications.

Q.2 Give an exhaustive note (with reference to your state) on the part played by container services, mode of propulsion and travel path, and terminal services of transport and goods. Substantiate your answer by actual data.

Q.3 Write an essay on the present 5-year plan target's and achievements of Indian Transport Planning, incorporating goals and policy.

Q.4 With respect to Trip Distribution discuss the following :

(i) Growth Factor Method, and

(ii) Synthetic Method.

Give actual-situation examples.

Q.5 Do an in-depth study of "*Manual of Economic Evaluation of Highway Projects in India*" (Indian Roads Congress, New Delhi, 1993).

Summarise its contents and give your comments.

Q.6 Study the main road(s) in your district, and write a critical appreciation of it with respect to the Guidelines for Selection of Highway Alignment. Give a sketch map of the road you study.

Q.7 Define various engineering properties of soil. Discuss their significance and determination. Give sketches of the equipment used in their determination.

Q.8 Giving examples (as explanations) write notes on the following :

(i) Boussinesq's Pressure Distribution.

(ii) Element of a 2-layered soil system.

(iii) Design of flexible pavements.

(iv) Pavement thickness design chart.

(v) CBR curves for Flexible Pavement Design.

(vi) Optimum Moisture Content.

Q.9 Giving actual-life examples (quote names) discuss various *soil stabilisation methods*.

Q.10 Do a detailed (and complete) traffic survey of a busy town in your district. Give data collection and analysis charts.

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# TUTOR MARKED ASSIGNMENT

## ET 507 (Part A)

### POLLUTANTS AND WATER SUPPLY

**Maximum Marks : 100** **Course Code : ET-507A**
**Weightage : 30%** **Last Date of Submission : July 31, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Pollutants and Water Supply.

Q.1 (a) Describe the various air pollutants and their effects on human beings.

(b) Describe the suitability of different air pollution control devices with respect to different pollutants.

Q.2 Discuss the suitable solid waste management systems in the context to Indian Urban Solid Waste.

Q.3 (a) Mention any three methods of softening water. Describe 'zeolite process' of softening water.

(b) What are the various operational troubles in rapid gravity filters? Discuss the cleaning of rapid gravity filters.

Q.4 (a) What are the modes of transmission of water borne diseases? Name the different pathogens associated with different water borne diseases.

(b) What is meant by 'disinfection' in treating public water supply? Give three major requirements of a disinfectant.

Q.5 In a continuous flow settling tank 3 m deep and 60 m long, what flow velocity of water would you recommend for effective removal of 0.025 mm particles at 25°C. The specific gravity of particles is 2.65, and kinematic viscosity $\upsilon$ for water may be taken as 0.01 $cm^2$/sec.

Q.6 (a) Explain briefly the following processes :

(i) Break point chlorination

(ii) Post chlorination

(b) It is required to supply water to a population of 20,000 at a per capita demand of 150 litres per day. The disinfectant used for chlorination is bleaching powder which contains 30 percent of available chlorine. Determine how much of bleaching powder is required annually at the water works, if 0.3 ppm of chlorine dose is required for disinfection.

Q.7 Describe the detailed format for the preparation of EIA of a proposed thermal power plant in Delhi.

Q.8 (a) Describe the different types of pumps used in water supply scheme with their suitability under different conditions.

(b) What is the difference between rural water supply and urban water supply?

Q.9 A town with a population of one lakh is to be supplied with water daily at 200 litres per head. The variation in demand is as follows :

| | | |
|---|---|---|
| 6 am to 9 am | - | 40% of total |
| 9 am to 12 noon | - | 10% of total |
| 12 noon to 3 pm | - | 10% of total |
| 3 pm to 6 pm | - | 15% of total |
| 6 pm to 9 pm | - | 25% of total |

Determine the capacity of the service reservoir assuming pumping to be at uniform rate and the period of pumping to be from 6 am to 6 pm. Neglect fire demand.

Q.10 Calculate the requirement of lime and soda for cold softening of 2,00,000 litres of raw water, found to have the following chemical composition :

Analysis of Raw Water :

| | |
|---|---|
| Dissolved | $CO_2$ = 39.6 mg/l |
| | $Ca^{++}$ = 44 mg/l |
| | $Mg^{++}$ = 18 mg/l |
| | $Na^{+}$ = 16 mg/l |
| Alkalinity | ($HCO^{-}_{3}$) = 122 mg/l. |

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# TUTOR MARKED ASSIGNMENT

## ET 507 (Part B)

### WASTE WATER TREATMENT

**Maximum Marks : 100** **Course Code : ET-507B**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Waste Water Treatment.

Q.1 Give the brief outline of the preliminary investigations required for preparation of a sewerage scheme project for a town.

Q.2 A population of 1,30,000 is residing in a town having an area of 160 hectares. If the average coefficient of runoff for this area is 0.60, and the time of concentration of the design rain is 30 minutes, calculate the discharge for which the sewers of a proposed combined system will be designed for the town in question. Make suitable assumptions where needed.

Q.3 Write detailed notes on :

(a) Maximum and minimum permissible velocities in sewers.

(b) Non-scouring and self-cleansing velocity.

(c) Circular and egg-shaped sewer sections.

Q.4 (a) A grit chamber with a proportional flow weir at its outlet is to be designed to handle a sewage flow from a population of 50,000 and a per capita daily consumption of water of 123 litres. Design the grit chamber.

(b) Why is it necessary to provide grit chamber in sewage treatment plans for combined sewerage system? Discuss.

Q.5 Differentiate between aerobic and anaerobic treatment of sewage giving major end products. Name major treatment methods in each category.

Q.6 (a) Discuss the factors which influence the working of activated sludge process.

(b) It is proposed to install a two stage trickling filter for treatment of 3.8 MLD of raw sewage with BOD = 200 ppm. The following particular are given :

(i) The filter loading is 1100 gm/$m^3$ of BOD.

(ii) Re-circulation ratio is 1 for each filter.

(iii) 35% BOD removal in primary tank.

(iv) Total volume is equally divided into two filters.

What will be the BOD of the effluent?

Q.7 (a) Why is sludge digestion necessary? Discuss.

(b) Discuss the effect of pH and temperature on sludge digestion.

Q.8 Design sludge drying beds for digested sludge from sewage treatment plant with trickling filters serving 2,00,000 population.

Q.9 (a) Explain the composition of sewage and also the possible methods of measuring the strength of sewage.

(b) Critically discuss one and two pipe systems of plumbing.

Q.10 Sketch an Indian type water closet with associated fittings and fixtures and explain its working.

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# TUTOR MARKED ASSIGNMENT

## ET 508 (Part A)

### STRUCTURAL DESIGN - I

**Maximum Marks : 100** **Course Code : ET-508A**
**Weightage : 30%** **Last Date of Submission : July 31, 2017**

**Note :** All questions are compulsory. Marks assigned to the questions have been shown in brackets. This assignment is based on all Blocks of Structural Design - I.

Q.1 (a) Write short notes on

(i) Characteristic strength

(ii) Characteristic loads

(iii) Partial safety factors

(b) Prove that at limit state, (i) the total compressive force in concrete on a unit width of a rectangular cross-section is equal to 0.36 $f_{ck}\, X_u$ and (ii) distance of its CG from the outer most fibre in compression is 0.42 $X_u$.

(5 + 5 = 10)

Q.2 (a) Determine the moment of resistance of RC beam for the following data :

$b$ = 300, $d$ = 450, $d'$ = 45, $A_{St}$ = 5 $\phi$ 25, $A_{SC}$ = 2 $\phi$ 25, $F_Y$ = 415 MPa, and $f_{ck}$ = 20 MPa.

(b) Design a beam for shear reinforcement having a cross section of $b$ x $D$ = 350 x 500 reinforcement with 4 $\phi$ 20. The factored shear force = 130 kN. Use $M_{15}$ concrete and $Fe_{250}$ steel. Provide vertical stirrups only as shear reinforcement.

(c) Define bond stress and discuss the mechanism of bond between concrete and reinforcement.

(4 + 4 + 2 = 10)

Q.3 (a) Explain with sketches different design considerations and design loads for masonry piers and abutments for bridges.

(b) Design for flexure only a RC beam of 5 m clear span supported on two walls of 300 mm thickness and carrying a super-imposed load of 20 kN/m. Use $M_{20}$ concrete and $Fe_{415}$ steel. Use limit state method for design.

(4 + 6 = 10)

Q.4 (a) Explain codal provision of development length at simple support and at point of inflexion.

(b) Design a simply supported beam of 6m clear span. The beam is supported on 375 mm thick wall and loaded with a super-imposed dead weight of 20 kN/m as well as a live load of 12 kN/m. Use $M_{20}$ concrete and $Fe_{250}$ steel.

(c) Design a continuous beam for superimposed dead and live loads of 12 kN/m and 14 kN/m respectively. Use $M_{20}$ concrete and $Fe_{250}$ steel. See Figure 1. (Assume wall width 375 mm).

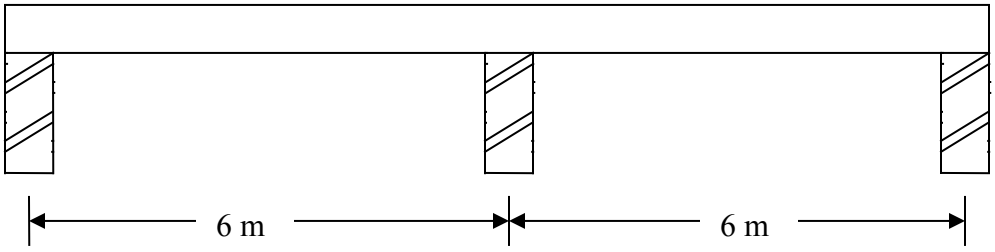


**Figure 1**

(1 + 3 + 6 = 10)

Q.5 (a) Design a lintel for 2 m wide central opening in a brick wall of total length of 3.5 m of a room of total inside dimension 3.5 m x 3.0 m for the following data :

(i) thickness of wall = 40

(ii) thickness of RC roof slab = 120

(iii) lime terrace thickness = 150

(iv) parapet wall over the roof of 1m ht. and 100 thick

(v) height of wall above lintel = 1.0 m

Use M 20 concrete and Fe 250 steel.

(b) Design a circular roof slab of inside dia 5.625 m, supported on brickwall of 375 mm for the following data :

Roof slab thickness = 180

Lime concrete thickness = 150

Live load on roof = 0.75 kN/m$^2$

Use M 20 concrete and Fe 415.

(4 + 6 = 10)

Q.6 (a) Explain the procedure for fixing total depth '*D*' of footing.

(b) Design a rectangular footing for a rectangular column of 300 x 400 mm carrying a load of 600 kN. The safe bearing capacity of soil is 150 kN/m$^2$. Use M 20 concrete and Fe 250 steel.

(3 + 7 = 10)

Q.7 (a) Two column having cross-section of 500 x 500 mm and 600 x 600 mm are transmitting loads of 1450 kN and 1750 kN respectively. The centre-to-centre distance between the column is 5m and the bearing capacity of soil is 300 kN/m$^2$. Design a combined rectangular footing with beam joining the columns.

(b) What are the methods of analysis for design of a raft foundation?

(8 + 2 = 10)

Q.8 (a) Describe the various types of joints used in water tanks.

(b) Design an over-head water tank for a capacity 1000 kl with 18 m staging. The net safe bearing capacity of soil at 2.0 m depth is 100 kN/m$^2$. The tank is located in Delhi.

(2 + 8 =10)

Q.9 (a) Design a slab culvert for given data :

| | |
|---|---|
| Location of culvert | National Highway |
| Carriageway | Two-lane width |
| Material | M 20 |
| Clear span, $L_C$ | 6.0 m |

(b) Explain the relative merit and demerits of using the virtual work and equilibrium method of analysis.

(5 + 5 = 10)

Q.10 Design a RC counter-fort retaining wall to support the difference in ground elevation of 8.0 m. The depth of foundation may be taken as 2.0 m below ground level, with an allowable bearing capacity of 160 kN/m$^2$. The top of the earth retained is horizontal with a unit weight 18 kN/m$^2$ and an angle of shearing resistance of 30$^o$. The coefficient of friction between soil and concrete may be taken as 0.5.

(10)

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# TUTOR MARKED ASSIGNMENT

## ET 508 (Part B)

### STRUCTURAL DESIGN - II

**Maximum Marks : 100** **Course Code : ET-508B**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory. Marks assigned to the questions have been shown in brackets. This assignment is based on all Blocks of Structural Design - II.

Q.1 (a) Explain method of design of structures. Also explain stress-strain diagrams for steel. Explain design of steel frameworks.

(b) Write short notes on

(i) Load factor

(ii) Factor of safety

(iii) Working stress method of design

(iv) Plastic analysis of structures

(v) Fully-rigid design in steel frame

(c) Explain failure of a riveted joint with sketch.

(3 + 5 + 2 = 10)

Q.2 (a) Determine what load could a hand-driven rivet 20 mm diameter safely carry if it connects plate 16 mm thick and is in (i) Single shear, (ii) double shear ($f_y$ of plate is 220 $MP_a$).

(b) A tie member of a roof truss consists of 2 ISA 90 mm x 60 mm x 10 m. The tie member is subjected to pull of 250 kN. The angles are connected to either side of a gusset plate 8 mm thick. The size of weld should not exceed ¾ $^{th}$ thickness of the rolled steel section at the toe.

(c) Design a lap joint to connect two plates of sizes 150 x 6 mm and 150 x 12 mm. The joint should develop the full strength of the thinner plate.

(4 + 3 + 3 = 10)

Q.3 (a) Determine the net area of a plate section 250 x 20 mm size with rows of holes in a straight chain (parallel to the line of pull). The rivets are 16 mm dia. and the edge distance is 30 mm.

(b) Design the bottom chord tension member of a steel bridge truss along with its riveted connections to carry a total tensile force of 1600 kN. (Allowable stress in steel $\sigma_{at}$ = 150 MPa). The length of the member is 5 m.

(c) Determine the size of a sag rod for a tensile force of 30 kN, the purline spacing are 2 m centre to centre. ($\sigma_{at}$ = 150 MPa).

(4 + 3 + 3 = 10)

Q.4 (a) A 6m long steel column is pinned at both ends and carries an axial load of 2200 kN. Design a suitable column section.

(b) Explain Euler's Theory and modification of the same. Explain local buckling.

(c) Design a column for an axial load of 2600 kN. The effective length of the column is 4 m.

(5 + 2 + 3 = 10)

Q.5 (a) A column effectively restrained in position as well as direction at both ends carries an axial load of 1800 kN. The length of the column is 5 m. Design a compound column with double lacing system.

(b) A simply supported beam of span 10m is carrying an uniformally distributed load 35 kN/m. Design a beam using standard I-sections, if the compression flange of beam is laterally supported throughout its length.

(c) Explain about lateral supported and unsupported beams?

(4 + 4 + 2 = 10)

Q.6 (a) Discuss the various types of web splices and explain when they are adopted.

(b) Design a welded plate girder to carry a superimposed load of 12 tones per meter on an effective span of 25 meters.

(2 + 8 = 10)

Q.7 (a) A column of section ISHB 300 @ 630 N/m. Design the splicing at the joint. The ends are milled for full bearing. Take $f_y$ = 250 N/mm$^2$.

(b) Design a column base for an ISHB 300 section column carrying an axial loads of 300 kN and a BM of 75 kN in the plan of the web (Bearing pressure on footing is 4 MPa).

(5 + 5 = 10)

Q.8 (a) A hand operated 50 kN overhead crane is provided in a workshop. The details are given below :

(i) centre to center between gantry girder = 16 m,

(ii) span of the gantry girder = 6 m,

(iii) weight of the crane = 40 kN,

(iv) wheel spacing = 3 m

(v) weight of crab =10 kN, and

(vi) maximum edge distance = 1 m

Design a simply supported gantry girder, assuming the flange is laterally supported.

(b) The sliding end of a roof truss rests on 450 mm brick wall through a concrete bearing pad. The maximum normal reaction of the bearing is 125 kN. The principal rafter is inclined at 30$^o$ to the main tie, which is horizontal. If the panel length of the principal rafter is 1.38 metre, design rafter, the tree and the sliding joint.

(5 + 5 = 10)

Q.9 (a) Design a welded plate girder bridge for broad gauge main line of span 25 m.

(c) Design a rocker bearing. Following data is given :

Vertical load due to (DL+ LL+ IL) = 900 kN

Vertical load due to wind = 200 kN

Lateral load due to wind = 250 kN

Longitudinal load = 300 kN.

(5 + 5 = 10)

Q.10 (a) What is the basic of Airy's theory?

(d) Design a bunker of size 12 m length x 6 m width. It has 4 m depth vertical plate and height of through is 4 m. Use coal storing.

(e) ©Design a self-supporting steel chimney of 100 m height. The diameter of the cylindrical shell is 4 m. The chimney has a 100 m thick brick lining supported on the shell.

(2 + 4 + 4 = 10)

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# TUTOR MARKED ASSIGNMENT

## ET 524 (Part B)

### CONSTRUCTION MANAGEMENT-I

**Maximum Marks : 100** **Course Code : ET-524B**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Construction Management-I.

Q.1 "A good project manager has an eye for the ground". This eye for the ground leads to good site planning. How can this eye for the ground be sharpened through systematic analysis of certain key issues? Elaborate any five issues giving the factors, aspects and importance of each.

Q.2 Drawings are known as the language of engineers. List out the differences in tabular forms between the following drawings :

(a) Architectural drawings v/s Structural drawings

(b) Sectional drawings v/s Pictorial drawings

(c) Survey drawings v/s Working drawings

(d) Floor drawings v/s Utilities and Services drawings

Q.3 What do you understand by controlled blasting? Which all explosives are used for this (Give commercial name as well as scientific name)? Describe any two projects where controlled blasting technique was used in a major way.

Q.4 Criteria for potability is considered safe to use water for construction, but at times this is not true, explain why? Is it advisable to do curing with water obtained from melting snow? Justify your answer.

Q.5 Estimation minimizes the unknown and optimizes the description, dimensions and quantities of the project. Elaborate the principles involved and explain how estimation differs from valuation?

Q.6 What do you understand by Manning Schedule, Time Schedule and Resource Plan? Explain the difference among them through illustration of bar charts.

Q.7 What do you understand by time analysis and explain with example how activity time plays an important role?

Q.8 What do you understand by Approximate Estimates and why this required? Explain the five methods of obtaining Approximate Estimates.

Q.9 The arch of a culvert subtends an angle of $120^{\circ}$ at the center. The span of the arch is 5.00 m and the thickness of the arch is 50 cm. The length of the arch is 8.00 m from face to face. Calculate the quantities of arch masonry work and cement plastering in the soffit of the arch.

Q.10 The cost of improving an existing 25 km long road is Rs. 4.00 lakhs per km. Road user costs, with and without the improvements, accident costs with and without the improvements and maintenance costs with and without the improvements are given in Table 1.0 for a 10 year period after the completion of the improvements. Assuming a discount rate of 10%, find out whether the project is economically justifiable. Use NPV method.

**Table 1.0**

| Year | Road User Cost | | Accident Cost | | Maintenance Cost | |
|---|---|---|---|---|---|---|
| | **With *impr*** | **Without *impr*** | **With *impr*** | **Without *impr*** | **With *impr*** | **Without *impr*** |
| 0 | - | - | - | - | - | - |
| 1 | 105.5 | 126.5 | 1.1 | 3.1 | 3.5 | 2.5 |
| 2 | 110.3 | 132.2 | 1.1 | 3.1 | 3.5 | 2.5 |
| 3 | 115.8 | 138.9 | 1.2 | 3.5 | 3.5 | 2.5 |
| 4 | 121.6 | 145.8 | 1.2 | 3.7 | 3.5 | 2.5 |
| 5 | 127.6 | 153.0 | 1.3 | 3.8 | 3.5 | 2.5 |
| 6 | 134.0 | 161.0 | 1.3 | 4.0 | 3.5 | 2.5 |
| 7 | 140.7 | 168.9 | 1.4 | 4.2 | 3.5 | 2.5 |
| 8 | 147.8 | 177.0 | 1.5 | 4.4 | 3.5 | 2.5 |
| 9 | 155.1 | 186.2 | 1.6 | 4.7 | 3.5 | 2.5 |
| 10 | 162.9 | 195.2 | 1.6 | 4.9 | 3.5 | 2.5 |

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# TUTOR MARKED ASSIGNMENT

## ET 525

### CONSTRUCTION MANAGEMENT - II

**Maximum Marks : 100** **Course Code : ET-525**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Construction Management - II.

Q1. A company is in the business of preparing pre-fabricated steel frame doors with in-laid wirenets along with chowkhats, finished with red oxide base coat painting. There is a stable market for its produced goods with an annual off-take of 5000 sets of which 75% are sold on credit and the balance 25% on cash sales with a discount of $1\frac{1}{2}$ % on sales price. The cost breakdown per set is as under :

| | | |
|---|---|---|
| Raw materials | : | Rs. 1000 |
| Labour employed | : | Rs. 250 |
| Cost for plant and equipment used | : | Rs. 150 |
| Overheads | : | Rs. 200 |
| Total manufacturing cost | : | Rs. 1600 |
| Mark up profit | : | Rs. 400 |
| Selling price | : | Rs. 2000 |

Raw materials are kept in stock for 3 weeks with credit by suppliers for 6 weeks, work in progress for an average of one week. Finished goods are in the godown/shop with an average of 2 weeks. Customers purchasing on credit pay an average by 5 weeks delay. Plant and equipment hired are available for 3 weeks credit. Overhead and expenses are paid for within 8 weeks' delay on an average. Labour is paid with 4 weeks' delay. The firm keeps a minimum of Rs. 25,000 as cash in hand and its bank balance. Manufacturing continues without break at a uniform pace.

How much of working capital would be needed for generally hassle-free conduct of business. (**Note :** A year is to be taken of 52 weeks).

Q.2 (a) Define "inventory valuation". Discuss in brief the different methods of inventory valuation.

(b) What is depreciation? Explain the different methods of prorating the depreciable cost.

Q.3 (a) What are the advantages and disadvantages of pre-qualification of bidders? What are the consequences if unqualified contractors are employed on a job?

(b) Discuss the provisions normally made in respect of the following :

(i) Deviation orders, and

(ii) Termination of the contract.

Q.4 What is organisational culture? What are its important characteristics? What strategies would you adopt to bring a cultural change for total Quality Management in your organisatioin?

Q.5 (a) Discuss the "Fixed Quantity System" and "Fixed Period System" for placing inventory orders.

(b) Perform ABC analysis using the following data :

| Item | Units | Unit Price (Rs.) | Item | Units | Unit Price (Rs.) |
|---|---|---|---|---|---|
| 1 | 700 | 5.00 | 7 | 6000 | 0.20 |
| 2 | 2400 | 3.00 | 8 | 300 | 3.50 |
| 3 | 150 | 10.00 | 9 | 30 | 8.00 |
| 4 | 60 | 22.00 | 10 | 2900 | 0.40 |
| 5 | 3800 | 1.50 | 11 | 1150 | 7.10 |
| 6 | 4000 | 0.50 | 12 | 410 | 6.20 |

Q.6 (a) Discuss the specific characteristics of construction industry, which makes it different from other industries.

(b) Discuss various group of stake-holders involved in a construction project. Each group has its own motivations and narrow perspective, resulting in conflict. Discuss the responsibilities of these groups and measures you suggest to reduce the conflicts.

Q.7 (a) What are the main sources of project finance?

(b) Discuss the tasks undertaken during the "close-up phase" of the project.

Q.8 The end products of financial accounting are the financial statement comprising the Balance Sheet, Profit and Loss Account and Statement of Changes in Financial Position. Discuss the objectives and contents of each of these statements giving suitable examples.

Q.9 (a) What is Human Resource Management? Discuss its role particularly in construction industry. How does it differ from Human Resource Development?

(b) What is industrial relations? What is the role of various partners in creating congenial industrial relation in the construction industry.

Q.10 Write short notes on the following :

(i) Disciplinary procedure

(ii) Waste management

(iii) Quality circle

(iv) Performance characteristic of construction equipment

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# TUTOR MARKED ASSIGNMENT

## ET 535 (Part A)

### ELEMENTARY HYDROLOGY

**Maximum Marks : 100** **Course Code : ET-535A**
**Weightage : 30%** **Last Date of Submission : July 31, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Elementary Hydrology.

Q.1 (a) Enumerate the science associated with hydrology.

(b) Discuss the major components to be considered for carrying out a regional water budget study.

(c) What are the main processes responsible for making water available on land surface? Why do we need to study our atmosphere?

(4 + 3 + 3 = 10)

Q.2 (a) Describe various ways of expressing water vapour content in the atmosphere. Discuss in details.

(b) What do you understand by precipitable water? Explain as to how would you estimate it for an area?

(c) Calculate the precipitable water (mm) in a 10-km high saturated atmospheric column if the surface conditions are : air temperature = 22°C, pressure = 101.3 kPa and the lapse rate (α) is 6.0°C/km

(2 + 2 + 6 = 10)

Q.3 (a) Discuss how to express the net solar energy received at the earth's surface. Explain atmospheric circulation system.

(b) Discuss differential heating of earth and its effect on the atmosphere.

(c) Discuss the important features of different types of rain gauge.

(4 + 3 + 3 = 10)

Q.4 (a) A reservoir with a surface area of 300 hectares had the following average values of parameters during a given week: water temperature = 20°C, relative humidity = 40% and wind velocity at 1.0 m above the ground = 18 km/h. Estimate the average daily evaporation from the lake and the total volume of water evaporated from the lake during that one week.

(b) Calculate by energy balance method, the evaporation rate from an open water surface, if the net radiation is 200 W/$m^2$ and the temperature is 25°C, assuming no sensible heat or ground heat flux.

(c) Explain analytical methods for the determination of lake evaporation.

(4 + 4 + 2 = 10)

Q.5 (a) Distinguish between the terms potential evaporation and the actual evaporation. Explain the relation between the two.

(b) A catchment is at a latitude of 12°18'N, and at an elevation of 750 m above MSL.

The mean monthly temperatures observed are given below :

| **Month** | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mean monthly Temp. (°C)** | 21.5 | 24.5 | 26.0 | 28.0 | 27.0 | 25.0 | 24.0 | 23.5 | 24.5 | 24.0 | 24.5 | 21.0 |

Calculate the monthly and annual PET for this catchments using Thornthwaite formula.

(c) Bring out the difference between depression storage and surface detention.

(3 + 5 + 2 = 10)

Q.6 (a) What is the importance of infiltration in hydrologic cycle? Explain the typical shape of an infiltration curve. Discuss the practical importance of φ – index.

(b) Explain the basic steps involved in estimation of storm runoff.

(c) Explain estimation of snowmelt.

(4 + 2 + 4 = 10)

Q.7 (a) For a catchment in Uttar Pradesh, the mean monthly rainfall and temperature are given below. Calculate the annual runoff coefficient by Khosla formula.

| **Month** | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Temp. (˚C)** | 12 | 17 | 20 | 28 | 30 | 35 | 30 | 30 | 27 | 28 | 20 | 14 |
| **Rainfall (mm)** | 4 | 4 | 2 | 0 | 2 | 12 | 31 | 30 | 16 | 2 | 1 | 2 |

(b) Explain flow duration curve and also explain the characteristics of flow duration curve.

(c) Observed values of runoff, at a stream gauging site are given below. Upstream of the gauging site, a weir, built across the stream, diverts 3.0 and 0.5 M $m^3$ of water per month for use in irrigation and industry. The return flows from irrigation, estimated at 0.8 $Mm^3$ per month, and from the industry at 0.3 $Mm^3$ per month, joins the stream upstream of the gauging site. Estimate the virgin flow of the river. If the catchment area is 120 $km^2$ and the average annual rainfall is 185 cm also determine the runoff-rainfall ratio.

| **Month** | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Runoff (mm)** | 2.0 | 1.5 | 0.8 | 0.6 | 2.1 | 8.0 | 18.0 | 22.0 | 14.0 | 9.0 | 7.0 | 3.0 |

(4 + 2 + 4 = 10)

Q.8 (a) Explain "Non recording stream gauging station" and "recording stream gauging station".

(b) The velocity of float in a stream was observed to be 5.0 m/s. Compute the average flow velocity corresponding to this observation. Adopt a reasonable value of the required coefficient and explain why this coefficient is needed.

(c) What is the difference between the discharge measurement using current meter in an ordinary stationary boat and in a moving boat? Explain "Dilution Technique of stream flow measurement".

(3 + 3 + 4 = 10)

Q.9 (a) What is the main difficulty in using the slope area method of discharge measurement?

(b) In a rectangular channel which is 16 m wide, the depth of flow and cross-sectional areas are measured as 3.5 m, 52.5 $m^2$ and 3.4 m, 51.0 $m^2$ at two sections 250 m apart. The drop in the water surface elevation was found to be 0.10 m. Assuming Manning's coefficient to be 0.015 estimate the discharge through the channel.

(c) Explain components of Runoff and Hydrograph.

(3 + 5 + 2 = 10)

Q.10 (a) Define unit hydrograph and assumptions made in the theory of unit hydrograph. Also explain application of unit hydrograph.

(b) Explain "Synthetic unit hydrograph" and methods used for the development of synthetic unit hydrograph.

(c) Explain "unit hydrograph from complex storm events". Explain methods for analysis of the same events.

(4 + 3 + 3 = 10)

**BTCM**

# TUTOR MARKED ASSIGNMENT

## ET 535 (Part B)

### HYDRAULIC STRUCTURES

**Maximum Marks : 100** **Course Code : ET-535B**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Hydraulic Structures.

Q.1 (a) Explain what is a mass curve. Discuss (through sketches) its various uses, utilising demand, reservoir capacity and spillway capacity as parameters.

(b) What reservoir capacity is required to produce a yield (at a uniform rate) of 73800 $m^3$ per year for a site where the monthly flow during a critical flow period are given as under (Neglect the effects of evaporation and precipitation) :

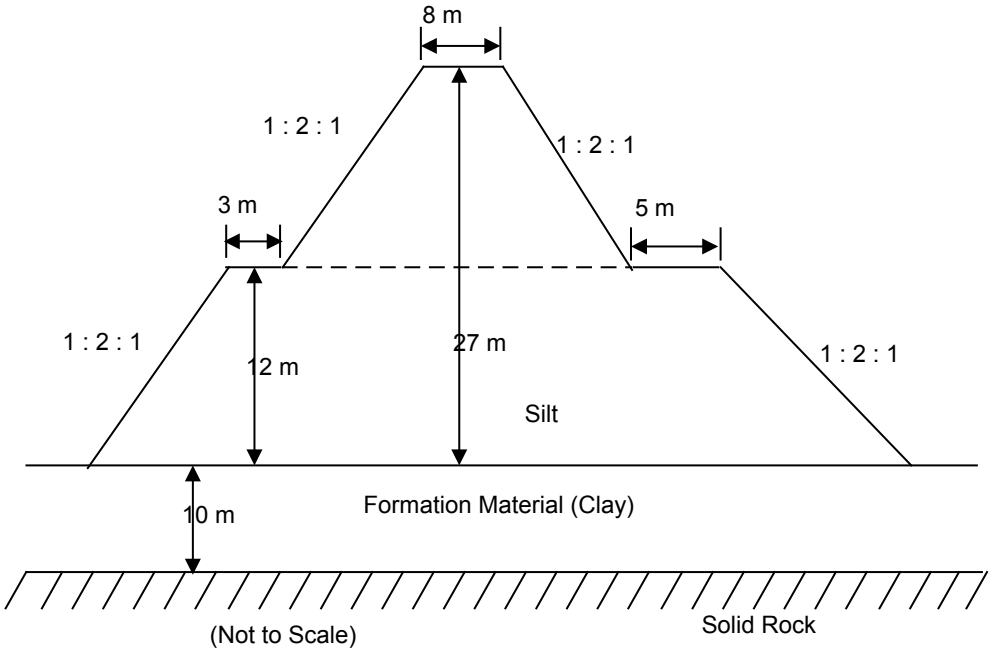
| Month | $m^3$ | Month | $m^3$ | Month | $m^3$ |
|---|---|---|---|---|---|
| October | 22140 | October | 7380 | October | 18450 |
| November | 27060 | November | 7380 | November | 20910 |
| December | 20910 | December | 6150 | December | 30750 |
| January | 31980 | January | 3690 | January | 57810 |
| February | 18450 | February | 2460 | February | 19680 |
| March | 39360 | March | 1230 | March | 22140 |
| April | 9840 | April | 0 | April | 8610 |
| May | 3690 | May | 0 | May | 4920 |
| June | 0 | June | 0 | June | 0 |
| July | 0 | July | 0 | July | 1230 |
| August | 0 | August | 0 | August | 3690 |
| September | 0 | September | 8610 | September | 4920 |

Q.2 Design an overflow and non-overflow sections of a gravity dam for following conditions :

Max pond level = 100.00 m
Max flood level = 97.0 m
Crest level of spillway = 95.2 m
Max flood discharge = 35000 $m^3/s$
Average bed level at the site = 57.00 m
Width of approach channel = 515.00 m
Dead storage level = 80.00 m
Deepest foundation level = 55.00 m
Fetch of reservoir = 7.2 km
Wind velocity = 86.00 km/hr.

Q.3 An earth dam (refer figure) is to be constructed from a silt which when compacted at its optimum moisture content, has a specific weight, $\gamma$ = 192.00 kg/m$^3$; cohesion, $C$ = 1953 kg/m$^2$; angle, $\phi$ = 26°; and a coefficient of permeability = 2.7 $\times$ 10$^{-3}$ metre/minute. Geological investigations show that the foundation consists of a 10 m layer of clay with $\gamma$ = 132.00 kg/m$^3$, $C$ = 4900 kg/m$^2$, $\phi$ = 12°, permeability as negligible.

Check this proposed dam for embankment stability, seepage and foundation stress.




**Figure**

Q.4 With the help of relevant literature/books pick up and draw five typical rockfill dam sections – each on half-size drawing sheet.

Q.5 Design a weir to be built on fine micacious sand ($C$ = 15 kN/m$^2$), using following data :

RL of full supply level in canal = 103.0 m

RL of river bed = 100.00 m

Height of drop shutters = 1.0 m

Max discharge per meter run of weir = 2.2 m$^3$/s.

Winter discharge is just sufficient for the requirements of the canal; and the weir is just submerged when 1.2 m of water is passing over the crest.

Give full dimensional section of the structure.

Q.6 Draw (on a full-size drawing sheet) plan and sections (at relevant locations) of a canal Head Regulator. Explain main design features and function of each component.

Q.7 (a) A dam (base width = 30 m) holds water on one side to a depth of 10.0 m. A pile, 2 m deep is placed at the upstream end of the base. Draw a seepage net under the dam; and determine the exit gradient at the toe of the dam.

(b) Consider 2.0 m depth of water at the downstream end in addition to 10.0 m on the upstream end, and also a pile 3.0 m deep at the toe, draw the net and find the exit gradient.

Q.8 Write an essay on the status of irrigation facilities in India before 1947, and the status at present (2005), highlighting the role of five-year plans, basin-wise planning, and multipurpose as well as minor irrigation schemes.

Q.9 Sketch out the typical layouts of different canal systems, such as, inundation canals, traditional canal distribution systems, and navigation canals. Give sections of each system at important locations to bring out essential details.

Q.10 (a) Design an irrigation channel (by Kennedy's theory) to supply 55 $m^3/s$ at a bed slope of 1/4000, with Kutter's $N = 0.025$.

(b) Design the canal for the data given in (a) by Lacy's procedure if $f = 0.90$.

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# TUTOR MARKED ASSIGNMENT

## ET 537 (Part A)

## SOIL CONSERVATION AND AGRONOMY

**Maximum Marks : 100** **Course Code : ET-537A**
**Weightage : 30%** **Last Date of Submission : July 31, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Soil Conservation and Agronomy.

Q.1 Write an essay on soil as a natural resource and status of soil erosion in different states of our country.

Q.2 Describe in detail the Modified Universal Soil Loss Equation (MUSLE). How is it different from USLE?

Q.3 Differentiate between design features of a graded terrace and bench terrace. Write step-by-step procedure for design of a terrace system for an area where land slope is 18 percent.

Q.4 Prepare a status report on menace of gully erosion in India. Write down merits and demerits of temporary structures of gully control.

Q.5 From standpoint of water management, explain importance of irrigation and drainage structures employed on a farm. With neat sketches explain how to design three main types of such structures.

Q.6 An area near Karnal is badly affected with alkalinity. Detail out the various options for reclamation of such soil. Which option would you recommend to the farmers and why?

Q.7 Write crop production practices for better yield of rice crop in some part of eastern India where present production is below national average.

Q.8 What is organic farming? Write details of certain bio-pesticides suitable for vegetable crops.

Q.9 What are main types of disasters faced by Indians farmers? Write in details various measure in drought management.

Q.10 Write different components of integrated watershed management. Write in details the avenues of commercial activities in a watershed.

**BTWRE**

# TUTOR MARKED ASSIGNMENT

## ET 537 (Part B)

### AGRICULTURAL LEGISLATION AND MANAGEMENT

**Maximum Marks : 100** **Course Code : ET-537B**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Agricultural Legislation and Management. Use other sources of information including internet for preparation of this assignment.

Q.1 "Rural credit is a vital input to agricultural production system." Justify the statement in the present rural scenario of India. What are other vital input?

Q.2 Discuss the strengths and weaknesses of co-operative credit in India. Write an essay on contribution of NABARD in ameliorating the condition of rural economy.

Q.3 "Rural unemployment is a burgeoning problem in India." Discuss recent efforts by Government in this regard alongwith their impacts in mitigating this problem.

Q.4 Write the characteristics of good marketing system? Evaluate agricultural marketing of rural India on different aspects.

Q.5 Prepare a status report on contributions of different live stocks to Indian economy. Discuss the role of co-operative movements in strengthening dairy Industry in India.

Q.6 What is agricultural technology information system? How is it helpful in achieving goal of dissemination of agricultural knowledge to farmers?

Q.7 What are the steps in disaster management? Write drawbacks of disaster management programmes of India.

Q.8 List various woman upliftment programmes launched by Indian Government. How self-help group scheme has been helpful in transforming lives of women in our country?

Q.9 What is the present status of CADP? How is it different from Integrated Watershed Management Programme? Make a performance report of these programmes in India for the last two decades.

Q.10 List the drawbacks of Green Revolution. Describe the aim and objectives of slogan of Rainbow Revolution of ICAR.

**BTCM**

# TUTOR MARKED ASSIGNMENT

## ET 581 (Part B)

### INVENTORY AND STORES MANAGEMENT

**Maximum Marks : 100** **Course Code : ET-581B**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Inventory and Stores Management.

Q.1 (a) Explain the role of Procurement Department in Inventory Management.

(b) A company needs 6000 units of a product per month. The product is purchased from outside for which the set-up cost is Rs. 2000 per order. The cost of holding inventory, in terms of capital tied up amounts to Rs. 1.50 per unit per month. How frequently should the company place orders of the product?

Q.2 (a) Illustrate the factors that influence the layout of the store.

(b) Distinguish between dependent and independent demand in a McDonald's, in a integrated manufacturer of personal copies, and in a pharmaceutical supply house.

Q.3 (a) How does inventory contribute to the value-adding activities of a firm? When should inventory be considered a symptom of waste?

(b) Explain the role of Bin Card in the store. Write a brief note about the Suspense Account.

Q.4 (a) What is buffer stock? List the reasons for keeping a buffer stock.

(b) What kind of policy or procedure would you recommend to improve the inventory operation in a department store? Justify your answer with suitable example.

Q.5 (a) Suppose the lead time for procurement of a product gets doubled. Will you recommend doubling its buffer stock? Justify your answer.

(b) Battery Wholesale, Inc., purchases batteries for Rs. 140 each, and it costs Rs. 110 to process an order. The company sells about 12,000 of a particular type of battery per year at a uniform rate. The company opens 5 days a week for 52 weeks per year with the exception of six holidays a year. The order lead time is 3 days, and the company wants to have an average of 2 day's sales on hand as safety stock when a new order is scheduled to arrive. The holding cost is estimated to be 24 percent of the item cost per year.

Determine :

(i) The EOQ,

(ii) The expected level of maximum inventory,

(iii) The reorder level,

(iv) The average inventory level, and

(v) The average annual cost to hold inventory.

Q.6 A company has a monthly demand of 800 units of a product. The company can produce 8 products per hour when it starts a production run. It costs Rs. 3000 for shop set-up to start a production run. The inventory carrying cost amounts to Rs. 1.50 per unit per month. What is the optimal batch size? Assume 25 working days in a month and eight working hours in a day. How frequently should the production run be undertaken and what should be the length of each run?

Q.7 An item for which the daily demand is 20 per day, is produced at the rate of 50 units per day. The set-up cost is Rs. 1000 per cycle and the inventory holding cost is Rs. 0.20 unit per day.

Find :

(i) the economic lot size,

(ii) the cycle time, and

(iii) the minimum cost per day.

Q.8 Suppose that the demand for a product is 30 units per month and the items are withdrawn at a constant rate. The set-up cost each time a production run is undertaken to replenish inventory is Rs. 150. The production cost is Rs. 10 per item, and the inventory holding cost is Rs. 3.0 per item per month.

(a) Assuming shortages are not allowed, determine how often to make a production run and what size it should be.

(b) If shortages are allowed but cost Rs. 30 per item per month, determine how often to make a production run and what size it should be?

Q.9 A local distributor for a national tire company expects to sell approximately 9,600 steel-belted radial tires for a certain size and tread design next year. Annual carrying costs are Rs. 160 per tire, and ordering costs are Rs. 750. The distributor operates 288 days a year

(i) What is the EOQ?

(ii) How many times per year does the store reorder?

(iii) What is the length of an order cycle?

Q.10 A toy manufacturer uses 48,000 rubber wheels per year for its popular dump truck series. The firm makes its own wheels, which it can produce at a rate of 800 per day. The toy trucks are assembled uniformly over the entire year. Carrying cost is Rs. 10 per wheel a year. Set-up cost for a production run of wheel is Rs. 450. The firm operates 240 days per year. Determine each of the following :

(i) Optimal run size.

(ii) Minimum total annual cost for carrying and set-up.

(iii) Cycle time for the optimal run size.

(iv) Run time.

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# TUTOR MARKED ASSIGNMENT

## ET 581 (Part C)

### BUILDING SERVICES

**Maximum Marks : 100** **Course Code : ET-581C**
**Weightage : 30%** **Last Date of Submission : July 31, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Building Services.

Q.1 What is the difference between 'escalators' and 'elevators'? Explain by means of diagrams their main components and operation.

Q.2 Write short notes on :

(i) Clarification in water treatment,

(ii) Hardness of water and its removal,

(iii) Maintenance of water supply distribution system, and

(iv) Maintenance of elevated water tanks.

Q.3 Why are lightening protection systems needed? Name the various components of a lightening conductor, describing their functions.

Q.4 Write short notes on :

(i) Solid waste management,

(ii) Disposal of treated effluents,

(iii) Manholes, and

(iv) Septic tanks.

Q.5 What is the need of conserving energy in a HVAC system? Explain some of the methods used for conserving energy in an existing plant.

Q.6 Write short notes on :

(i) Uninterruptible Power Supply (UPS),

(ii) Emergency Power Supply System,

(iii) Maintenance of domestic electric equipment, and

(iv) Electrical Shock Protection Methods.

Q.7 How is presence of termites objectionable in a building? Describe briefly some of the pre-construction and post-construction treatments adopted for control of termites.

Q.8 How does fire commonly start and spread in a building? What are the measures to be adopted to minimise fire-hazards in a building?

Q.9 Write short notes on the following :

(i) Varnish,

(ii) Distemper,

(iii) Corrosion, and

(iv) Sealants.

Q.10 What are the different types of electrical wiring system used in a building? Describe by means of sketches a typical wiring system in a two-bed room residential apartments.

**BTWRE**

# TUTOR MARKED ASSIGNMENT

## ET 581 (Part F)

### MECHANICAL EQUIPMENT IN CONSTRUCTION (ELECTIVE-I)

**Maximum Marks : 100** **Course Code : ET-581F**
**Weightage : 30%** **Last Date of Submission : Sept. 30, 2017**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Mechanical Equipment in Construction.

Q.1 (a) What are the components of cycle time of a machine? How is the efficiency factor of a machine defined?

(b) How are job and management factors used to determine the expected output of an equipment?

Q.2 (a) What are the various costs considered in evaluating the economic life of equipment?

(b) What is depreciation? What are the different methods to determine the depreciation rates of construction equipment?

Q.3 A construction machine costs Rs.15,000/- and has an expected life of 8 years and salvage value of Rs. 4,000. It is expected to work 200hrs in a year. Compute the yearly depreciation for the machine using,

(i) straight line,

(ii) double declining balance,

(iii) sum of the years-digits, and

(iv) sinking fund methods

Q.4 (a) How are draglines classified? What are the advantages and disadvantages of drag lines?

(b) What effects do depth of cut and angle swing have on the output of drag lines? How do the size of bucket and the length of boom affect the output of a drag line?

Q.5 (a) What are trenchers, their utility and their types? What factors affect the production rates of trenchers?

(b) How are bucket excavators classified? How is the theoretical output of a bucket excavator assessed?

Q.6 (a) Explain the relative merits of crawler and wheel-based equipment?

(b) Describe the operation of a tree dozer.

Q.7 (a) What is a grid roller and for what type of soil is it best suited?

(b) Explain the working of a tamping foot/pad foot roller.

Q.8 (a) Describe about concrete mixtures. What are the various types of concrete mixtures? Explain briefly about the drum type concrete mixtures.

(b) What are the different types of concrete buckets used in large construction? How is mass concrete defined? What are the normal construction practices to lower the placement temperature of concrete?

Q.9 (a) Why does the drilling pattern differ in surface and underground excavations? What factors affect the drilling pattern in surface works?

(b) Why do you require delay detonators? Where are delay detonators used? What are electric detonators? How are they advantageous over other types of detonators?

Q.10 (a) What are the different types of control equipment provided on outlets and spillways of hydraulic structures? What are their requirements?

(b) What are the various types of control valves? Explain briefly about each control valve.