Department of Examinations

Exam Completed - Question Papers

Mid Semester Exam (Winter-2014 Session)

Branch: Civil Engineering

Semester: V

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H.O.D (Civil)

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SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY

B.E. Semester- (V) - MID SEMESTER EXAMINATION (WINTER’15 Session)

SUBJECT: Conventional Power Engineering (151906)

DATE: 15/10/14 TIME: 2:00 PM-3:15PM MAX. MARK: 30

Instructions: 1. All the questions are compulsory.
               2. Figures to the right indicate full marks.
               3. Assume suitable data if required.

Q.1 (a) Explain the phenomenon of Cavitation in hydraulic turbines. State its effects and how it can be minimized. (04)
(b) Explain the processes in simple Rankine Cycle on p-v and T-S diagrams and derive an expression for thermal efficiency. (06)

Q.2 (a) What do you mean by breeding? With a neat sketch explain fast breeder reactor. (05)
(b) What are the criteria for selection of sites for hydro electric power plant? (05)

OR

Q.2 (a) Explain Pressurized Water Reactor (PWR) with its advantages and disadvantages. (05)
(b) Draw the schematic layout of Hydro-Electric Power plant and state the functions of its main components (05)

Q.3 (a) A Parson’s reaction turbine running at 600 rpm with 50% reaction develops 86 kW per Kg of steam. The exit angle is 30° and the steam velocity is 1.56 times the blade velocity. Determine
   i. Blade Velocity
   ii. Blade inlet Angle
   iii. Maximum Blade Efficiency
(b) State various methods of improving efficiency of a gas turbine and discuss any one of them. (04)

OR

Q.3 (a) Define blade efficiency and hence derive an expression for maximum blade efficiency for a single stage impulse steam turbine. (05)
(b) A gas turbine unit has a pressure ratio of 8:1 and maximum cycle temperature of 650°C. The isentropic efficiency of the turbine and compressor are 0.86 and 0.82 respectively. Calculate the power output in KW when the air enters the compressor at 25°C at a rate of 18 kg/s. Take \(C_p= 1.005 \text{ KJ/kg K}\) and \(\gamma = 1.4\) for compression process and \(C_p= 1.11 \text{ KJ/kg K}\) and \(\gamma = 1.333\) for expansion process. (05)
## Subject: Environmental Engineering (150603)

<table>
<thead>
<tr>
<th>Date: 17-10-14</th>
<th>Time: 2:00 to 3:15 P.M</th>
<th>Total Marks: 30</th>
</tr>
</thead>
</table>

### Instructions:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

### Q.1
(a) Explain the structure of atmosphere in detail with a neat sketch. 05

(b) Define the following terms:
- Sewage
- Sullage
- Soil pipe
- Water seal
- Antisiphonage pipe 05

### Q.2
(a) BOD of a sewage sample incubated for 5 day at 20°C temperature in 140 mg/l. Calculate BOD for 2 day incubation and 30°C temp. for the same sample. Assume \( K_{(20)} = 0.1 \) per day. 05

(b) What is pH? Find out how much acidic sample of pH 2.0 compared to sample of pH 6.0 05

**OR**

### Q.2
(a) State and explain the characteristics of waste with treatment suggested from paper & Pulp industries 05

(b) The waste water has BOD\(_5\) 20°C of 200 mg/l what shall be its BOD\(_3\) 25°C take \( K_{20} = 1.15 \) day\(^{-1} \) 05

### Q.3
(a) What is sanitary land filling? Describe the different factors to be considered for the site selection of sanitary land filling. 05

(b) What is solid waste management? Write short note on “composting”. 05

**OR**

### Q.3
(a) Differentiate between: (i) BOD & COD, (ii) Aerobic & Anaerobic decompositions of waste water. 05

(b) Short note on different impurities present in water with particle size distribution. 05

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B.E. Semester- (V) - MID SEMESTER EXAMINATION (Winter’14 Session)

SUBJECT: Geotechnical Engineering - I (150604)

Date: 14-10-2014 
TIME: 02:00 P.M. to 03:15 P.M. 
Total Marks: 30

Instructions: 1. Attempt all questions. 
2. Make suitable assumptions wherever necessary. 
3. Figures to the right indicate full marks.

Q.1 (a) Define and write down equation for Water content of soil, Specific gravity, Void ratio, Porosity and Density. (5-Marks) 
(b) Write down assumptions for Laplace equation and derive Laplace equation. (5-Marks) 

Q.2 (a) List out all types of soil structures. Explain flocculated and honey comb structure in detail. (5-Marks) 
(b) Write down difference between ‘Coarse Grained Soil’ and ‘Fine Grained Soil’. (5-Marks) 

OR

Q.2 (a) Soil has been compacted in Embankment at a bulk density of 2.15 gm/cm³ and water content of 12%. The value of specific gravity of soil solid is 2.65. Estimate the dry density, void ratio, degree of saturation and air content of compacted soil. (5-Marks) 
(b) A moist sample of soil has a mass of 630 gm. and volume of 300cm³ at a water content of 10%. Taking G=2.7, determine void ratio e, Degree of Saturation Sr and Percentage air voids na. (5-Marks) 

Q.3 (a) Define and write down equation for Plastic Index, Shrinkage Index, Liquidity Index, and Consistency Index. (5-Marks) 
(b) A soil has a liquid limit of 25%, plastic limit 15% and flow index of 12.5%. Natural water content of soil is 20%. Determine Plasticity Index, Liquidity Index and Consistency Index. (5-Marks) 

OR

Q.3 (a) Write down difference between Compaction and Consolidation. (5-Marks) 
(b) Determine coefficient of permeability in the horizontal and vertical directions for a deposit consisting of three layers of thickness 5m, 1m, and 2.5m and having the coefficient of permeability of $3 \times 10^{-2}$ mm/sec, $3 \times 10^{-5}$ mm/sec, and $4 \times 10^{-2}$ mm/sec, respectively. Assume the layers are isotropic. (5-Marks)
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B.E. Semester- (V) - MID SEMESTER EXAMINATION (Winter’14 Session)

SUBJECT: Hydrology & Water Resources Engineering (150602)

Date: 11-10-2014
Time: 02:00 P.M. to 03:15 P.M
Total Marks: 30

Instructions:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Enlist various types of rain gauges and explain any one in detail with diagram.

(b) An artesian tube well has a diameter of 20 cm. The thickness of aquifer is 30 m and its permeability is 40 m/day. Find its yield under a drawdown of 5 m at the well face use radius of influence as recommended by Sichaedt.

Q.2 (a) Drive an expression for discharge from a well in confined aquifer. The well fully penetrates it.

(b) The ordinates of 3 hour unit hydrograph are given below:

<table>
<thead>
<tr>
<th>Time in hours</th>
<th>0</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>21</th>
<th>24</th>
<th>27</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinates cumees</td>
<td>0</td>
<td>10</td>
<td>25</td>
<td>20</td>
<td>16</td>
<td>12</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Find the ordinates of a 6 hour unit hydrograph for the same basin, analytically. Also sketch this unit hydrograph. What is the peak value of discharge in this unit hydrograph?

OR

Q.2 (a) Thiessen polygons constructed for a network of 10 rain gauges in river basin yielded thiessen weights of 0.10, 0.16, 0.12, 0.11, 0.09, 0.08, 0.07, 0.11, 0.06, and 0.10. If the rainfalls recorded at these gauges during a cyclonic storm are 132, 114, 162, 138, 207, 156, 135, 158, 168, and 150 mm respectively determine the average depth of rainfall by thiessen mean and arithmetic mean methods. Also determine the volume of surface runoff at the basin outlet if 35 % of the rainfall is lost as infiltration. Take the area of the basin as 5800 km² and express your answer in million cubic meters.

(b) Explain in detail the factors affecting runoff.

Q.3 (a) Explain any two components of Hydroelectric scheme.

For a river, the estimated flood peaks, for two return periods by the use of Gumbel’s method are as follows:

<table>
<thead>
<tr>
<th>Return period (Years)</th>
<th>Peak flood (m³/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>400</td>
</tr>
<tr>
<td>50</td>
<td>360</td>
</tr>
</tbody>
</table>

What flood discharge in this river will have a return period of 1000 years?
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B.E. Semester- V - MID SEMESTER EXAMINATION (Winter’14 Session)

SUBJECT: Management II (150001)

Date: 09/10/2014          TIME: 2:00 pm to 3:15 pm          Total Marks: 30

Instructions:  1. Attempt all questions.
               2. Make suitable assumptions wherever necessary.
               3. Figures to the right indicate full marks.

Q.1 (a) Define Marketing and discuss the role of 4Ps in formulating marketing strategies.
       (b) Discuss the importance of Human Resource Management

Q.2 (a) Explain the factors affecting the plant location planning
       (b) What is Selection? Explain the selection process.

   OR

Q.2 (a) Distinguish between Process Layout and Product Layout.
       (b) XYZ Co. Ltd, producing a pen, which selling price is Rs 18 per unit has a fixed cost of Rs 75,000 and variable cost is Rs. 8 per unit. Calculate Break Even Point (BEP).

Q.3 (a) Discuss any two demand forecasting methods.
       (b) What are the sources of recruitment? Mention their advantages and disadvantages.

   OR

Q.3 (a) Explain various marketing concepts in detail.
       (b) Write a short note on types of tests.

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Q.1 (a) Define:

I. Right of way
II. Shoulder
III. Flexible pavement
IV. Rigid pavement
V. Stopping Sight distance

(b) Explain briefly various planning surveys required for the road projects.

Q.2 (a) Write a short note on IRC and CRRI.

(b) Define highway alignment. What are the requirements of ideal alignment of road?

OR

Q.2 (a) Explain the importance of road safety audit.

(b) Describe the procedure of flakiness index test and elongation index test.

Q.3 (a) The speeds of overtaking and overtaken vehicles are 100 and 80 kmph respectively. If the acceleration of the overtaking vehicle is 2.5kmph per second calculate the safe overtaking distance for one way traffic and two way traffic. What should be the desired and required lengths of overtaking zone in both cases?

(b) Explain the necessity of soil investigation and sub soil exploration.

OR

Q.3 (a) Calculate the maximum allowable speed on a horizontal curve of radius 350m if the maximum allowable values of lateral coefficient of friction is 0.15 and rate of super elevation is 0.07.

(b) Distinguish between bitumen and tar.
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B.E. Semester- (V) - MID SEMESTER EXAMINATION (Winter’14 Session)

SUBJECT: Structural Analysis - III (150605)

Date: 16-10-2014            TIME: 02:00 P.M. to 03:15 P.M.            Total Marks: 30

Instructions: 1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Calculate the stiffness matrix (S) and load vector \( AD_{\text{ADL}} \) for the structure shown in the **Figure-1**. Take EI constant. (5-Marks)

(b) A conical dome of 150 mm thickness and 3.5 m rise is to be used to cover a hall of 20m diameter. The live load of 2.5 kN/m\(^2\) is acting over the dome surface. Calculate meridional stress and hoop stress at the base of dome. Density of the concrete is 25 kN/m\(^3\). (5-Marks)

Q.2 (a) Derive an expression for meridional stress and hoop stress in conical dome subjected to Uniformly Distributed Load at crown. (5-Marks)

(b) Formulate the Flexibility matrix (F) and DQL vector for the structure shown in **Figure-2** using Integration Method. (5-Marks)

**OR**

Q.2 (a) Formulate the Flexibility matrix (F) and DQL vector for the structure shown in **Figure-3** using Ordinate Method. (5-Marks)

(b) Calculate Bending Moment \( M_{AB}, M_{BA}, M_{BC}, M_{CB} \) for the structure shown in **Figure-3**. Use Flexibility matrix (F) and DQL vector derived in Q.2(a) above. (5-Marks)

Q.3 (a) Write down difference between “Beam straight in plan” and “Beam curved in plan”. (5-Marks)

(b) What is Torsion Factor? Write down Torsion Factor equations for Circular, Elliptical, Equilateral Triangular and Hollow Circular sections. (5-Marks)

**OR**

Q.3 (a) Calculate the stiffness matrix (S) and load vector \( AD_{\text{ADL}} \) for the structure shown in the **Figure-4**. Take EI constant. (5-Marks)

(b) Calculate Bending Moment \( M_{AB}, M_{BA}, M_{BC}, M_{CB} \) for the structure shown in **Figure-4**. Use stiffness matrix (S) and load vector \( AD_{\text{ADL}} \) derived in Q.3(a) above. (5-Marks)