Exam.		Regular	
Level	BE	Full Marks	80
Programme	BCE	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

*Subject:* - Earthquake Resistance Design of Structure *(Elective II) (CE76501)*

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt **All** questions.
✓ The figures in the margin indicate **Full Marks**.
  Use of IS 1893-2002 (part-I) is allowed.
✓ Assume suitable data if necessary.

1. a) What is a fault? Explain each type of fault with a neat figure. [4]

   b) Estimate the moment magnitude of an event with rupture length of 120 km, rupture width of 40 km and slip of average fault slip of 3m. Take modulus of rigidity, as 3.5×10^{10} N/m². [8]

   c) What is an attenuation relationship? What are the main parameters of earthquake sources on which attenuation of the ground motion parameter depends? [4]

2. a) Define Seismic Hazard at a site. Explain in stepwise how deterministic seismic Hazard analysis of a site is carried out. [8]

   b) Write down the Rienter- Gutenberg Recurrence law. Explain how probabilistic density function of magnitude is obtained. [3]

   c) The main central Thrust (MCT-3.0) having a = 6.2 and b = 1.0 can produce maximum size of earthquake magnitude of 6.0 Richter scale. Calculate the Return period of the earthquake. [5]

3. The acceleration response spectrum values for a two storey shear building, as shown in the figure below, are given as $S_a = \begin{Bmatrix} 0.546 \\ 0.835 \end{Bmatrix}$ m/sec². Calculate for each mode of vibration, the maximum displacement, shear force and over turning moment at each storey level. Also determine total manimums for each of the response quantities of the above. [16]

$M_1 = 65$ KN-sec²/m
$M_2 = 75$ KN-sec²/m
1.2 I   1.2 I
2 I   2 I
6 m
3 m
3 m
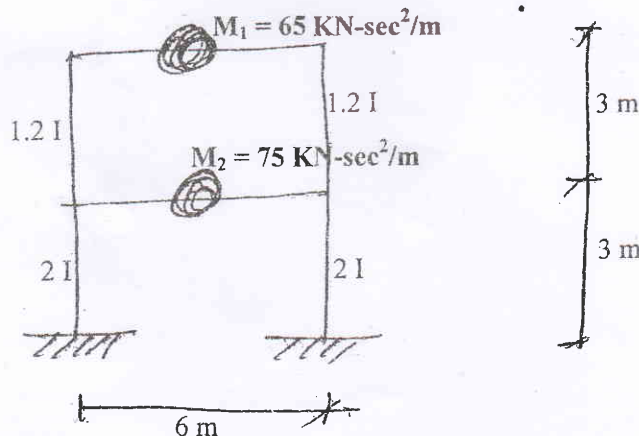
4. a) The figure shown below shows the plan of one-storey buildings, which may be considered as composed of 2-D frames along the orthogonal directions. The roof diaphragm is rigid in its own plane, and the mass of the roof is uniformly distributed. The building is subjected to a lateral load of 800 KN, due to earthquake, in Y-direction and passing through the centre of mass of the building. Calculate the lateral forces in the 2-D frames. [11]
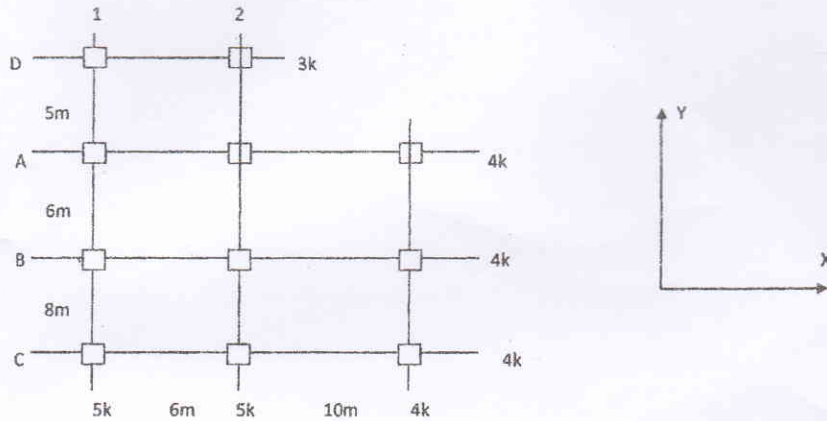
   b) Describe in brief the portal method of lateral load analysis of frame. [5]

5. Write short notes on: (Any four) [4×4]

   a) Rigid Diaphragm effect
   b) Probabilistic Seismic Hazard Analysis (PSHA)
   c) Ground motion parameters
   d) Seismic zoning
   e) Failure mechanisms of masonry wall

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Exam.		Regular	
Level	BE	**Full Marks**	80
Programme	BCE	**Pass Marks**	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Environmental Impact assessment *(Elective III) (CE78504)*

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt any **Five** questions.
✓ The figures in the margin indicate **Full Marks**.
✓ Assume suitable data if necessary.

1. a) What is the role of EIA for sustainable development? Discuss briefly on "Environmental issues has emerged from local to global scale." [4+4]

   b) Explain principles of EIA. Explain the various steps involved in EIA process with figure. [2+6]

2. a) Define screening criteria. Discuss methods for Initial Environmental Examination (IEE) of a small feeder road construction in your area. [4+4]

   b) What is environmental setting? Stepwise explain the methods to conduct scoping. [4+4]

3. a) What are the misconceptions about EIA or IEE? Discuss about the format of TOR. [8]

   b) Explain different types of environmental auditing. What is the role of ministry of forest and environment in environmental auditing in Nepal? [8]

4. a) Write down the methods of impact identification. Describe any method with suitable examples. [8]

   b) The domestic sewage of newly announced rural municipality is to be discharged into a river after treatment. Calculate the permissible effluent BOD_5 and the percentage purification necessary in the treatment plant with following data. Population = 20,000; DWF of sewage = 80 lpcd; BOD_5 contribution per capita = 0.075 kg/day; Minimum flow of river = 0.2 m^3/s, BOD_5 of the river = 1 mg/l; maximum allowable BOD_5 of river at downstream = 5 mg/l. [8]

5. a) State the types of mitigation measures. What are the considerations for implementation of Environmental Protection Measures? [8]

   b) Discuss the procedure and importance of stakeholder's consultation and public participation in the EIA process. [8]

6. Write short notes on: [4×4]
   a) Major section of EPA and EPR (1997) in Nepal
   b) Purpose and Importance of Baseline Data
   c) Terms of Reference
   d) Environmental Monitoring

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INSTITUTE OF ENGINEERING
Examination Control Division
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Exam.		Regular	
Level	BE	**Full Marks**	80
Programme	BCE	**Pass Marks**	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Environmental Impact Assessment *(Elective III) (CE78504)*

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt any **_Five_** questions.
✓ The figures in the margin indicate **_Full Marks_**.
✓ Assume suitable data if necessary.

1. a. Give brief account on legal procedure for the public participation during EIA procedure. What are the different principles of Environmental Assessment? [8]

    b. EIA is about doing the things right way, not only doing the right things. Explain? [8]

2. a. Explain different methods of impacts identification during EIA study in Nepal? [8]

    b. What are the objectives of EIA? Differentiate between Effects and Impacts. [8]

3. a. Explain about the environmental screening methodology? Give the proper linkage of EIA and project cycle. [8]

    b. Explain different types of EPMs. What is the role of MOEST in environmental auditing process in Nepal? [8]

4. a. A cement factory burns 5 tons of coal per hour and discharges the combustion products through a stack that has effective height of 80 m. The sulfur content of coal is 4.5%. The wind velocity at the top of the stack is 4 m/sec. The atmospheric conditions are moderately to slightly stable. Predict the impact on air environment at 850 m downwind distance. The guideline states that if the concentration of SO_2 (sulfur dioxide) exceeds $300\mu g/m^3$ in the ambient environment it may cause adverse impact on human health. Assume standard deviation of horizontal and vertical plum concentration at downwind distance of 850 m is 85 m and 54 m respectively. [8]

    b. What is alternative analysis of the project? Why baseline information is necessary during EA process? [8]

5. a. Define environmental monitoring? Discuss briefly about the types of the environmental monitoring? [8]

    b. Give an account of the importance of environmental management execution plan. What is the importance of EMAP chapter in an EIA report? [8]

6. Write short notes on: [16]
    a. Features of Environmental Protection Act 1997
    b. TOR for conducting IEE in hydropower project
    c. EIA is multidisciplinary and intersectoral
    d. Environmental scoping is heart of an EIA process

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Subject*: - Environmental Impact Assessment *(Elective III) (CE78504)

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt **All** questions.
✓ The figures in the margin indicate **Full Marks**.
✓ Assume suitable data if necessary.

1. a) What are the different roles of public participation in EIA process? Who are the different methods for involving the public in environment assessment process? [8]

   b) EIA is about doing the things right way, not only doing the right things. Explain. [8]

2. What are different types of impacts considered in EIA? What are the weaknesses of EIA study particularly in the contest of Nepal? [8]

3. a) What are the misconceptions about EIA or IEE? Give the proper linkage of EIA and project cycle. [8]

   b) How do you prepare TOR and scoping for EIA process? Briefly describe with an example related to irrigation Chanel in Nepal. [8]

4. What is EPM? What are the types of mitigation measures? Briefly discuss with an example for implementation. [8]

5. a) A waste water treatment plant at Bhaktapur discharge 2.75 m^3/s of water into stream whose flow rate is 18 m^3/s. The BOD_5 at 20°C of waste water is 30 mg/l and that stream is 3 mg/l. The waste water contains no DO but the stream contains 9.10 mg/l of DO. At 20°C de-oxygenation constant is 0.1/d and re-aeration constant is 0.3/d. Take saturation DO as 9.10 mg/l. Find out DO at the end of 1st and 2nd day and also explain why treatment plant is necessary. [8]

   b) Estimate the ground level concentration of SO_2 from a source of poorly controlled cement factory having stack ht 85m high at a distance of 10 km directly downward wind. When the wind speed is 5.5 m/s at tap of stock. The stability class is C. Current emitting 230 g/s of SO2. Take horizontal dispersion and vertical dispersion coefficient is 480m and 130m respectively. Discuss the impact evaluation technique on that cement factory. [8]

6. Write short notes on: [4×4]

   a) Project Cycle of EIA
   b) Environmental Auditing
   c) Impact identification
   d) IEE and its scope

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Subject: - Environmental Impact Assessment *(Elective III) (CE78504)*

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt **All** questions.
✓ The figures in the margin indicate **Full Marks**.
✓ Assume suitable data if necessary.

1. Define Environmental Impact Assessment and discuss on types, time frame and budget of EIA with reference to Nepal. Why do you carry out EIA before the detailed design work? [8]

2. a) What are the objectives of EIA? Differentiate between EIA and IEE. [8]

   b) What is scoping and why it is important part of EIA process? Develop Term of Reference (TOR) for EIA of water supply project which is proposed at Western Nepal. [8]

3. a) Describe purpose and importance of baseline data collection. Discuss method of baseline data collection for a new building project. [8]

   b) A diary industry discharge $3.17 m^3/s$ of waste water into stream whose flow rate is $21\ m^3/s$. The BOD_5 at 20°C of waste water is 30 mg/l and the stream is 2.1 mg/*l*. Stream contains 9.17 mg/*l* DO and waste water is purify. At 20°C $k_d = 0.1 d^{-1}$ and $k_r = 0.15\ d^{-1}$. Take DO as 9.17 mg/*l* at saturation level. Find out DO at the end of 1st and 2nd day and also explain why treatment plant is advisable to keep or not? If yes, what should be the percentage of treatment with respect to temp, DO and BOD? [8]

4. A solid waste transfer station is proposed to be established at your city. Explain why environmental protection measure is required for this project. As an EIA team leader what type of mitigation measures you will adopt? [8]

5. a) A brick factory is located near residential area. The physical stack height of the factory is 150m and the inside diameter of stack at exit is 1.5m. The wind velocity is 5m/s and stack gas exit velocity is three times the wind velocity. The barometric pressure is 1100 millibars and the temperature of stack gas at exit is 200°C and air is 35°C. Determine effective height of the stack and describe the effects of brick factory to the surrounding environment. [8]

   b) List out the objectives of environmental monitoring. What are the types of monitoring carried out in EIA? Discuss with an example. [8]

6. Write short notes on: [4×4]

   a) Environmental scoping is heart of an EIA process
   b) Impact evaluation technique
   c) EIA Review
   d) Public hearing in EIA

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