PURBANCHAL UNIVERSITY
2018

B.E. (Civil)/Seventh Semester/*Final*
Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16
BEG464CI: An Introduction to Earthquake Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

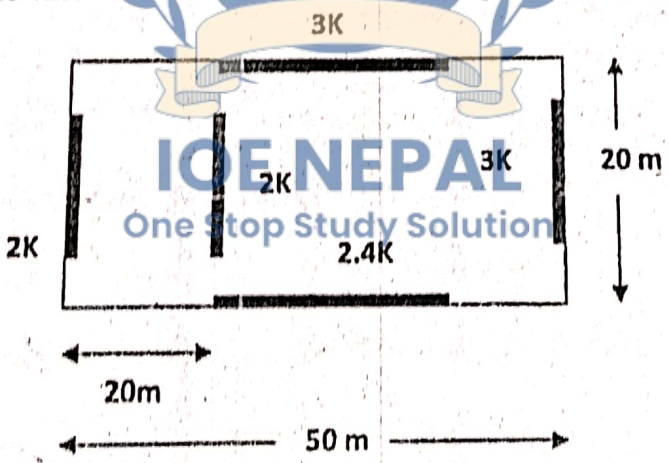
All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume necessary data appropriately if required. IS: 1893 (part I): 2002 and IS: 13920: 1984 are permitted to use.

Answer FOUR questions.

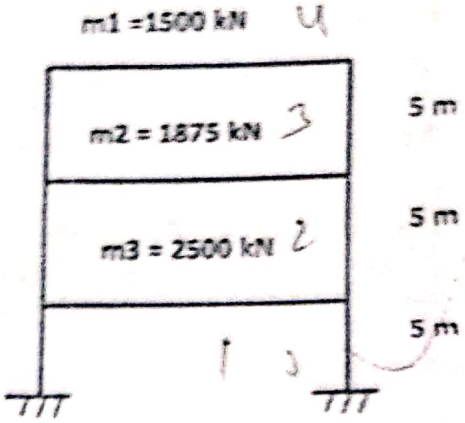
1(a) Justify the statement why your structure is Earthquake Resistant or Earthquake Proof. Write down the philosophy of Seismic Resistant Design. 2+3

(b) A vertical cable is 3.5m long, whose cross-sectional area is $5cm^2$. It supports a weight of 45KN at its lower end. Determine the natural period, natural frequency and cyclic frequency of the system. $E=2.45 \times 10^6 Kg/cm^2$. 5

2. Calculate the lateral force in the wall of one storey building due to the lateral force of 350 kN applied in Y direction and passing through the center of mass. The roof diaphragm is rigid in its own plane and mass at roof is uniformly distributed. 10



3. A three storey reinforced concrete frame building as shown, is situated in zone V. The height between the floors is 5 m and the total height of building is 15m. The dead load and normal live load is lumped at respective floor. The soil below the foundation is assumed to be of medium soil. Assume building is intended to be used as residential building. Determine the total base shear as per IS 1893 (Part-I): 2002 and distribute the base shear along the height of the building. 10



4(a) Why do you prefer dynamic analysis. Write down basic steps of dynamic analysis. 4

(b) Write short notes on any TWO: 3

(i) Difference between magnitude and intensity

(ii) Mechanism of Earthquake

(iii) Solution of Undamped Free Vibration 3

5(a) Derive an expression for solution of under-damped system. 7

(b) Define critically damped, over damped and under-damped system with figure. 3

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Chance*

Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

BEG454CI: An Introduction to Earthquake Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume necessary data appropriately jf required. IS: 1893 (part I): 2002 and IS: 13920. 1994 are permitted to use.

Answer FOUR questions. **4×10=40**

1(a) Explain and list Hazard due to earthquake. Explain basic requirements of earthquake resistant structure. 6

(b) Derive equation for free vibration damped SDOF system. 4

2. A plat form of weight 5000 lb is supported by four equal columns which are clamped to foundation and platform experimentally static force is determined to be F=1000lb considering dampling of 5%, determine: 10

(i) Undamped natural frequency

(ii) Absolute damping coefficient

(iii) Logarithmic decrement

3. Explain the following with example. 10

(i) Floor diaphragms and shear wall

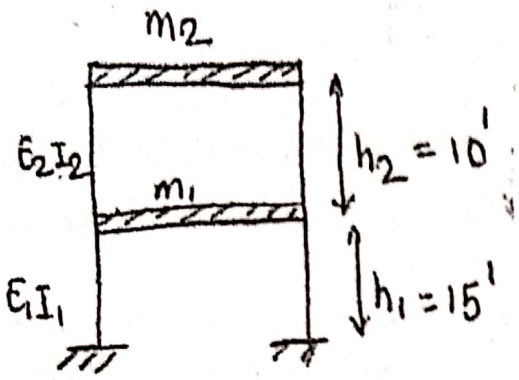
(ii) Centre of mass and centre of rigidity

(iii) Strength, stiffness and stability of building

(iv) Response spectra and attenuations laws.

(v) Seismic zoning and local soil condition

4. Find the natural frequency, fundamental time and mode shape of structure below 10



$m_1 = 661\ lbsec^2/in$

$m_2 = 136\ lbsec^2/in$

$E_1 = E_2 = 31 * 10^6\ psi$

$I_1 = 248.6\ in^4$ $I_2 = 106.3\ in^4$

5. Write short notes on any FOUR: 4×2.5=10

(a) Local soil conditions

(b) Ductile detailing of beam

(c) Ductile detailing of beam & column joint

(d) Effect of earthquake

(e) Causes of earthquake

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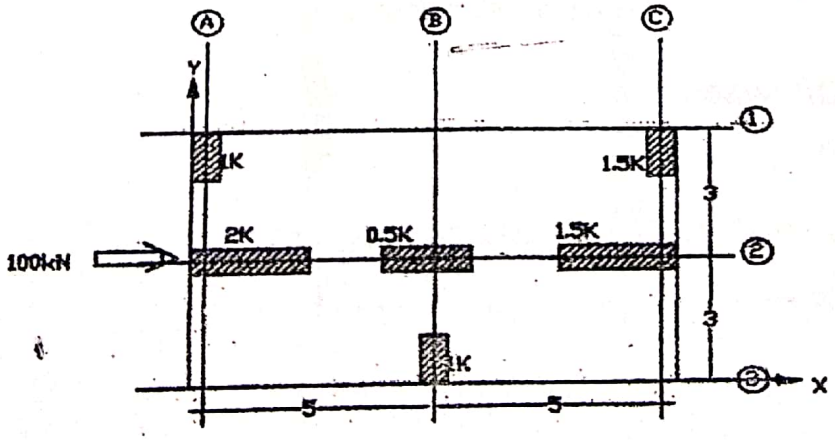
Answer FOUR questions. **4×10=40**

1(a) A vibrating system consists of a mass, 6kg, spring stiffness, 130N/m and a damper with a damping coefficient of 5 N-s/m. Determine: 6

(i) The damping factor.
(ii) The natural frequency of damped vibration.
(iii) The logarithmic decrement.
(iv) The ratio of two successive amplitudes.
(v) The number of cycles after which the initial amplitude is reduced to 25%.

(b) What do you understand by underdamped, overdamped and critically damped systems? Explain. 4

2. The figure below shows the plan of a single storey building with rigid floor diaphragm with six shear walls as shown in figures. These walls offer a negligible resistance to out of plane movement and in plane stiffness is as indicated in figure. Calculate the lateral force in the walls due to earthquake load of 100kN applied in X direction and passing through centre of mass. There is uniform load on roof (The linear, dimensions in figure are in m). 10



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3(a) Explain lateral load resisting systems. 5

(b) How do you do the ductile detailing of beams. Explain. 5

4. For a residential R.C.C. (SMRF) given below determine the seismic force using dynamic analysis procedure (RSA). The building is located on hard soil and situated in zone IV. 10

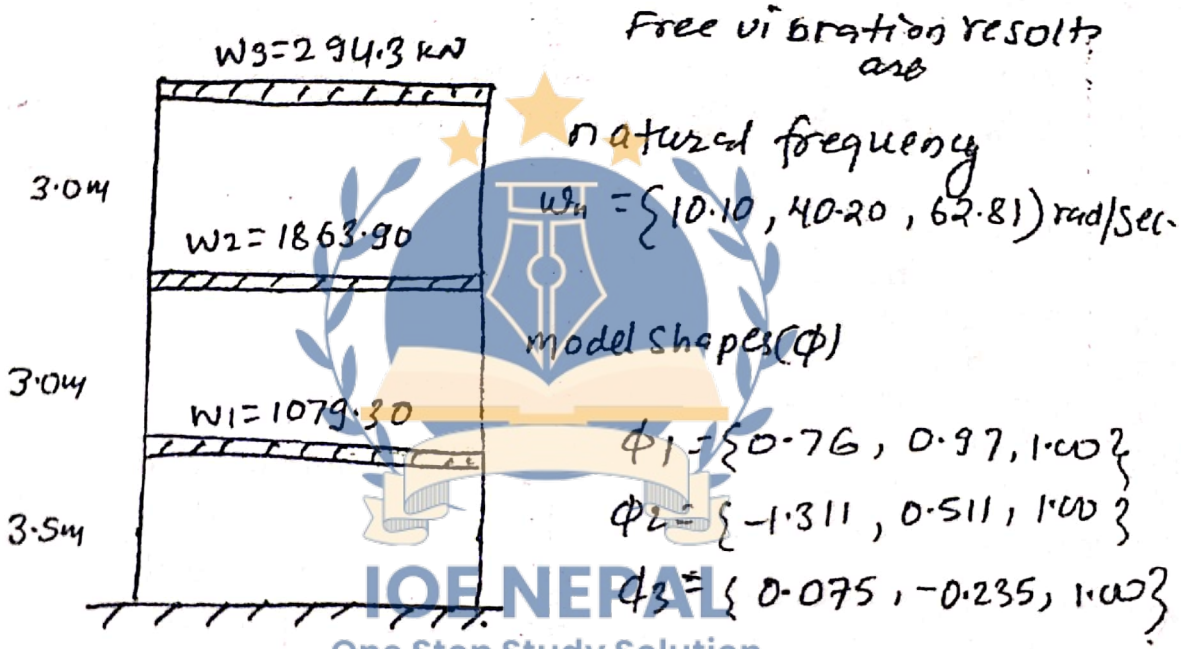

Fig. 4

5. Write short notes on any FOUR: 4×2.5=10

(a) Attenuation Laws

(b) Effect of earthquake

(c) Shear walls

(d) Modeling of MDOF system

(e) Response spectra

PURBANCHAL UNIVERSITY
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All questions carry equal marks. The marks allotted for each sub-question is specified along its side. IS 1893 (Part-I): 2002 code is allowed.

Answer FOUR questions.

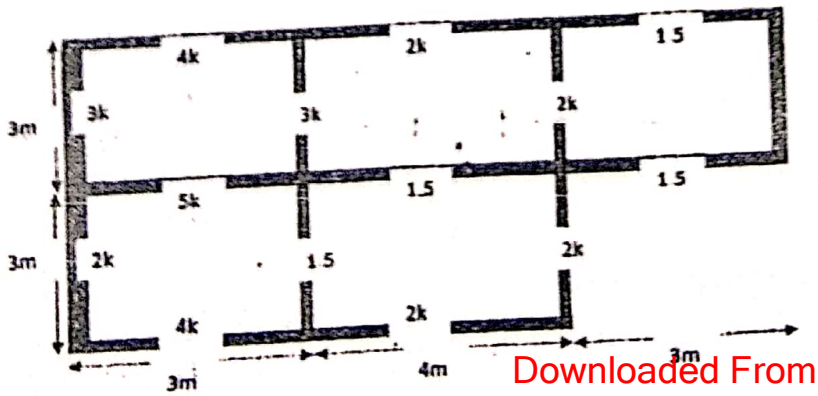
1(a) What are the various effects of earthquake. 4

(b) Justify with statement why your structure is earthquake resistant and discuss in brief requirement of earthquake resistant structures. 2+4

2(a) Determine the response considering the forced undamped condition. 5

(b) A vibration cantilever beam consisting of a weight of W=30 lb and a spring with stiffness k=15lb/in is viscously damped so that the ratio of two consecutive amplitudes is 1.00 to 0.5. Determine: (i) The natural frequency of the undamped system. (ii) The logarithmic decrement. (iii) The damping ratio. (iv) The damping coefficient. (v) The damped natural frequency. 5

3. Calculate the lateral forces in the walls of a single storey building, shown in the figure below due to a lateral earthquake force of 400KN applied in y-direction and passing through the center of mass. The roof diaphragm is rigid in its own plane, and the mass at the roof is uniformly distributed. The figure also shows the stiffness (shearing) values of all the walls. 10



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4. A 3-story building is to be constructed in the area of seismic zone III having medium soil. The dimension of the building is 15m× 20m. The height of each story is 3.5m. The live and dead load on each floor is 2.5 kN/m² and 10 kN/m², respectively. The live and dead load on the roof is 1.5 kN/m² and 5 kN /m², respectively. Take importance factor as 1 and response reduction factor as 5. Determine the seismic shear force in each story and overturning moment at the base as per IS: 1893 (Part 1)-2002. Take the value of Z=0.16, for Zone III and spectral acceleration for medium soil from IS: 1893 (Part 1)-2002 as: 10

$$\frac{S_a}{g} = \begin{cases} 1+15T & \text{for } 0 \le T \le 0.1 \\ 2.5 & 0.1 \le T \le 0.55 \\ 1.36/T & 0.55 \le T \le 4 \end{cases}$$

5. Write short notes on. 5×2=10
   (a) Dynamic Analysis
   (b) Diaphragms
   (c) Phenomenon of Earthquake
   (d) Ductile Detailing of Beam Column Junction
   (e) Magnitude and intensity

PURBANCHAL UNIVERSITY
2016

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Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

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Candidates are required to give their answers in their own words as far as practicable.

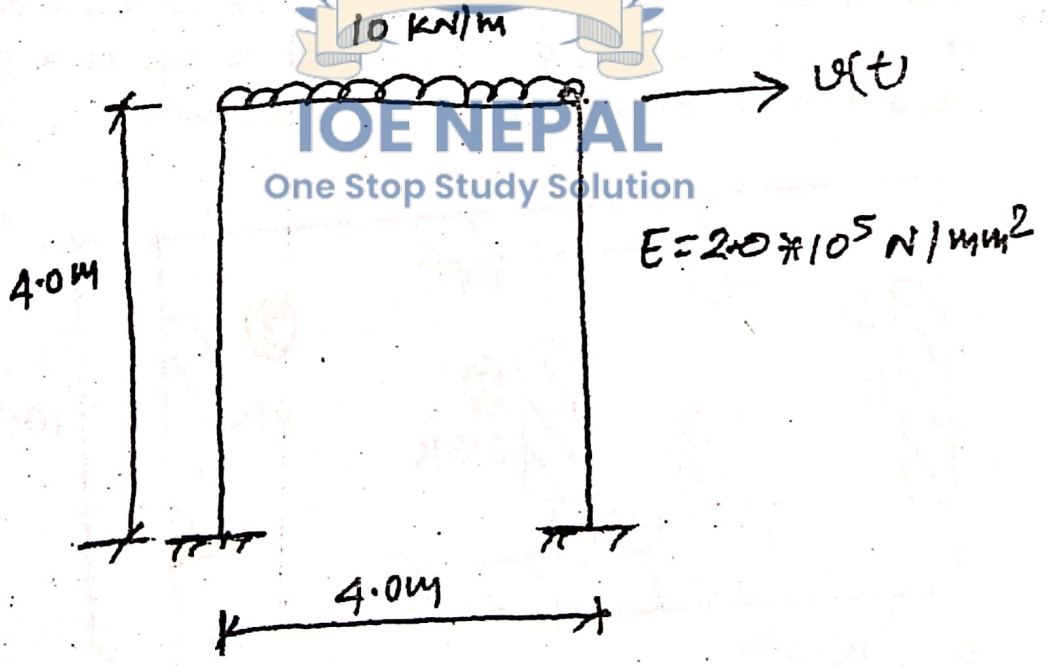
All questions carry equal marks. The marks allotted for each sub-question is specified along its side. IS 1893 (Part-I): 2002 code is allowed.

Answer FOUR questions.

1(a) Explain the effects of earthquakes. Discuss the measure of earthquake in terms of magnitude and intensity. 2+2

(b) Prove that the dynamic equilibrium or the equation of motion is independent of gravity. 6

2(a) Consider a RCC frame structure shown in figure. Assume (a) the masses of the columns are negligible and (b) the girder is sufficiently rigid to prevent rolation at the top of the column. Determine the natural frequency of the frame. Size of column is 240mm×240mm. 6



(b) Define centre of mass, centre of rigidity, floor diaphragm, moment resisting frames. 4

Contd. ...

3(a) A plat form of weight W=4000 lb is being supported by four equal columns which are clamped to the foundation as well as to the platform. Experimentally it has been determined that a static force of F=1000 lb. It is estimated that damping in the structure is of order 5% of critical damping. Determine for this structure the following: (i) Un-damped natural frequency, (ii) Absolute damping coefficient, (iii) Logarithmic decrement, (iv) the number of cycle and the time required for amplitude of motion to be reduced from initial value of 0.1 inch to 0.01 inch. 6

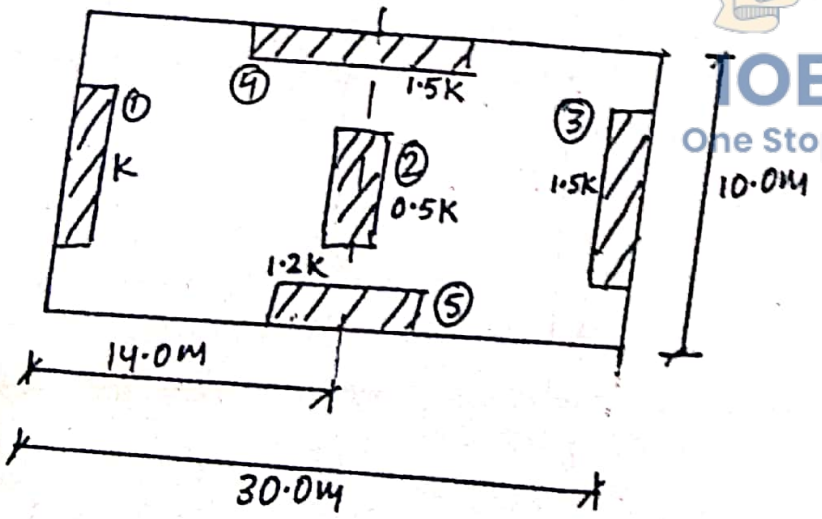
(b) Write short notes on any TWO: 2+2

(a) Ductility of the structure

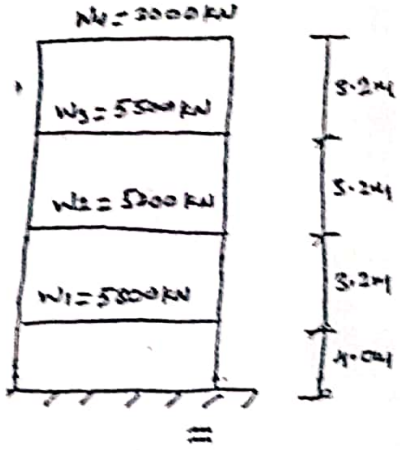
(b) Seismic zoning

(c) Underdamped system

4. Calculate the lateral force in the wall of one storey building due to lateral force 200KN applied in Y-dirⁿ and passing through centre of mass. The roof diaphragm is rigid in its own plane and mass at roof is uniformly distributed. (Consider earthquake load or lateral force acting in both directions, one at a time for calculating centre of rigidity). 10



5. For a 4-stroey Residential R.C.C. (SMRF) building w... been idealized as shown in figure. The building is lo... seismic zone V. The soil conditions are hard stiff. The ... weight wi are shown. Determine the design seismic loa... structure as per IS-1893:2002 by seismic coefficient me...



PURBANCHAL UNIVERSITY

2015

B.E. (Civil)/Seventh Semester/*Final*

Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

BEG454CI: An Introduction to Earthquake Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

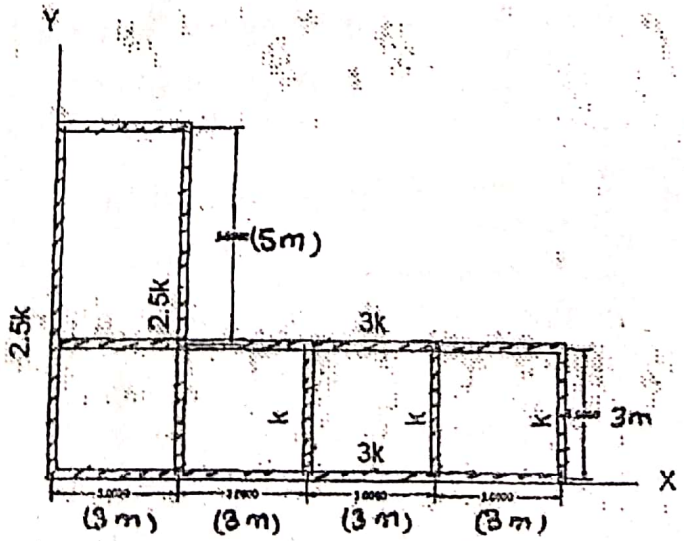
All questions carry equal marks. The marks allotted for each sub-question is specified along its side. IS 1893 (Part-I): 2002 code is allowed.

Answer FOUR questions.

1(a) Consider the Free undamped condition and determine the response due to it. 5

(b) A vibrating system consisting of a weight of W=20 lb and a spring with stiffness k=12lb/in is viscously damped so that the ratio of two consecutive amplitudes is 1.00 to 0.5. Determine: (i) The natural frequency of the undamped system. (ii) The logarithmic decrement. (iii) The damping ratio. (iv) The damping coefficient. (v) The damped natural frequency. 5

2. Calculate the lateral forces in the walls of a single storey building, shown in the figure below due to a lateral earthquake force of 500KN applied in y-direction and passing through the center of mass. The roof diaphragm is rigid in its own plane, and the mass at the roof is uniformly distributed. The figure also shows the stiffness (shearing) values of all the walls. 10

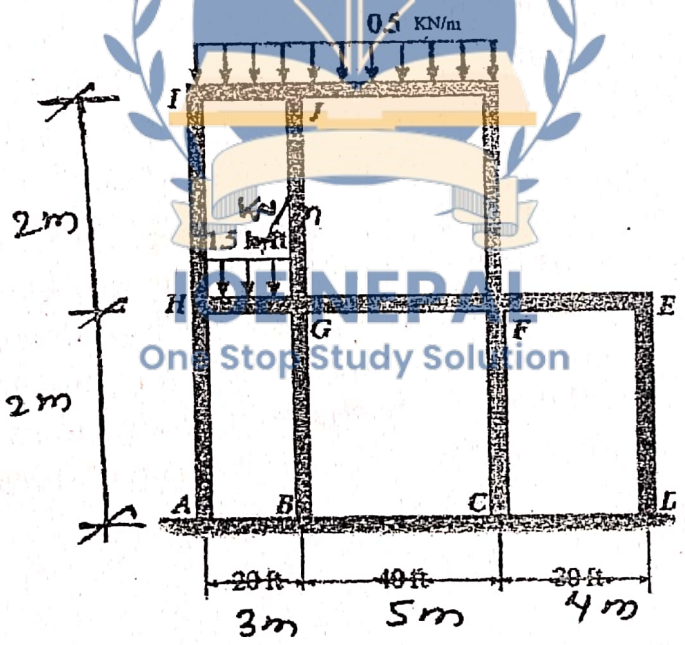


Contd. ...

3(a) What are the main types of faults? Describe briefly the seismic waves and their salient features. 3+3

(b) What are the basic requirements for earthquake resistant structures? 4

4. A two storey reinforced concrete frame building as shown is situated at seismic zone V. The height between the floors is 2.m, total height is 4m, the dead load, and live load is distributed as shown in figure below at respective floor. The soil below the foundation is assumed to be soft soil. Assume building is intended to be used as residential. Determine the total base shear as per IS 1893:200 (Part- I) distribute the base shear along the height of the building. 10



5. Write short notes on any FOUR: 4×2.5=10

(a) Causes of earthquake
(b) Scismic zoning
(c) Effects of earthquake
(d) Ductile detailing of Beam
(e) Modeling of MDOF system

KHWOPA ENGINEERING COLLEGE
VIII SEMESTER ASSESSMENT - 2010 (EVEN)

LEVEL:- B. E. (Civil) IV/II
SUBJECT:- BEG462/463 CI, Elective II (Earthquake Engineering)
FULL MARKS:- 80
TIME:- 03:00 hrs. 2067-11-12 PASS MARKS:- 32

Candidates are required to give their answers in their own words as far as practicab

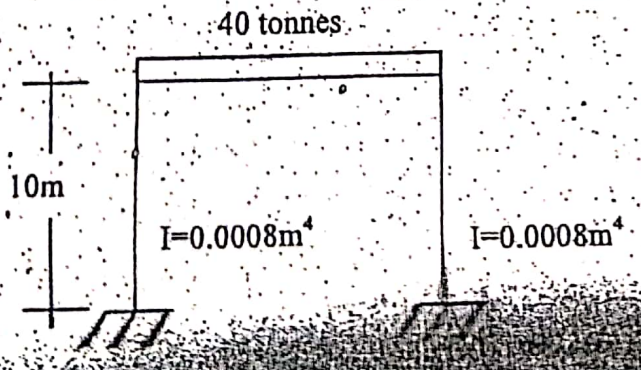
The figures in the margin indicate full marks

IS: 1893(Part I):2002, IS: 13920:1984 are permitted to use.

Attempt any four questions.

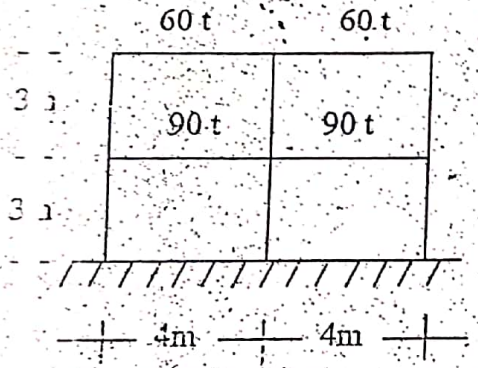
1. a. What is earthquake? Explain about earthquake waves. [1
   b. What is earthquake resistant design philosophy? Explain different types of lateral load resisting system buildings. [1

2. a. Explain different type of motions damped undamped, overdamped, dry and viscous damping. [1
   b. A steel portal frame as shown in figure having following data.
   Damping ration $\zeta = 0.05$
   $E = 2.05 \times 10^5$ N/mm^2
   Find undamped natural frequency (P) =?
   Find damped natural frequency (P_d) =?
   Logarithmic decrement (δ) =?
   Damped time Period (T_d) =? [1



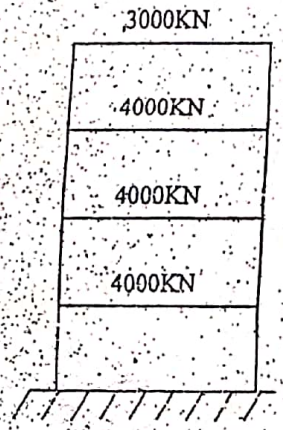
3. a. Derive an expresion for response (displacement) of undamped free vibration of sibgle degreee of freedom (SDOF) System. [10]

b. Find the natural frequencies and modes of vibrations for a structure shown below. Size of column is 300mmx300mm a. modulus of elasticcity of concrete is E=22360N/mm^2. [10]



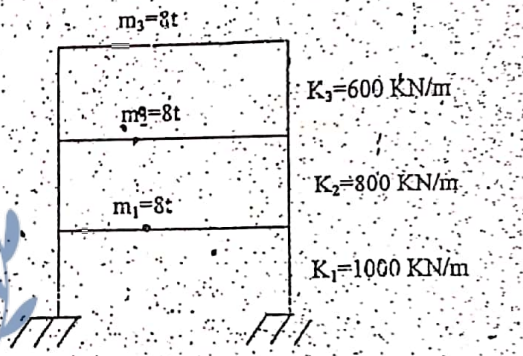
4 a) What do you mean by centre of mass and centre of rigidity and it's ecentricity? Also define the ductility and its impact on a structure. [10]

b) Determine the base shear and distribute along the height of building. The building is RC frame four stroey commercial complex, located in zone V. The soil below the foundation is assumed to be hard rock. The dead load and live load is lumped at the respective floor. Take height of each floor as 3.5m. [10]



5 Determine the later sheet forces at each storey by using SI S method. The building is residential, located at zone V and bui with special moment resisting frame. The soil below the foundation is assumed to be soft soil. $\omega_1 = 5.475$ rad/s, $\omega_2 = 13.7$ rad/s, $\omega_3 = 18.199$ rad/s.

$$\emptyset 1 = \begin{pmatrix} 0.410 \\ 0.800 \\ 1.000 \end{pmatrix} \quad \emptyset 2 = \begin{pmatrix} -0.714 \\ -0.258 \\ 1.000 \end{pmatrix} \quad \text{and} \quad \emptyset 3 = \begin{pmatrix} 1.137 \\ -1.208 \\ 1.000 \end{pmatrix}$$



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PURBANCHAL UNIVERSITY
2018

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG453CI: Hydropower Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Write down the trend of Hydropower development in Nepal at current situation. 6

(b) Analyzing the long term flow, the long term mean monthly flow of TadiKhola flowing in Nuwakot District is listed to be 4.21, 2.92, 2.14, 1.55, 2.92, 4.86, 21.02, 38.8, 32.33, 16.17, 7.76, 5.82 m3/s from January to December. The downstream release is fixed to be 10% of driest monthly flow. 1.5+1.5+4+3

(i) What is the design discharge when it is set to be at 40% exceedance?

(ii) If the net head is 300 m, plant efficiency is 85%, what will be the installed capacity of the project?

(iii) What is the firm flow, firm capacity, firm energy and secondary energy?

(iv) Compute the volume of the reservoir required to operate the station with firm capacity corresponding to the discharge $2m^3/s$ more than present firm flow?

2(a) The daily load curve of a certain village is estimated as follows:

Time (hr)	0-4	4-7	7-9	9-11	11-4	4-6	6-8	8-10	10-12
Load (MW)	10	14	18	16	13	15	18	20	12

The above load is supplied by a power plant with a design discharge of 19.8 m^3/s, operating head 150m and efficiency 81%. Compute the load factor, capacity factor, utilization factor and reserve factor. 1.5×4=6

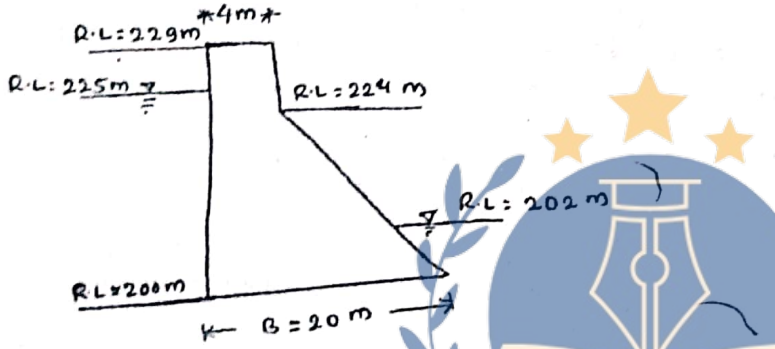
(b) What are surge tank and forebay? Explain their applicability and importance in the hydropower plant. 2+2

Contd. ...

(c) Define the energy dissipation and its necessity. What are the common type of energy dissipaters used in hydropower dams? Explain briefly with figures. 2+4

3(a) Explain in brief different causes of failure of earthen dam. 6

(b) Calculate the factor of safety against sliding; Overturning and also comment overall stability of concrete gravity dam. Assume necessary data. 10



Given, unit weight of concrete = 24KN/m³.

4(a) Explain the basic requirements of an ideal intake? Why side intake is mostly adopted in Nepal? Explain the bed load controlling measures near the side intake. 4+2+2

(b) Design a settling basin for a hydropower plant using simple settling theory with following data: Design Discharge = 5m³/s, Target particle = 0.2mm, Temperature = 25°C, and kinematic viscosity of water at 25°C= 0.897 centistokes. Take the initial depth of the basin as 3.5m and consider the effect of turbulence also. 8

5(a) What is mass curve? Differentiate it with flow duration curve. 3

(b) List out the progress hydrological studies in different level of study of hydropower project. 5

(c) Design Pelton turbine for a high head power plant with following features: Design Discharge = 5 m³/s, net head = 312.5m, overall efficiency = 85%, coefficient of velocity for nozzle = 0.98, jet ratio = 12, speed ratio = 0.45. 8

6 Write short notes on:
(a) Draft tube
(b) Role of tail water depth
(c) Typical X-section of hydropower plant
(d) Pressure tunnel

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG453CI: Hydropower Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Define firm power and secondary power. Classify the type of hydropower on the basis of head and explain shortly. 2+4

(b) Mean monthly flow of a Nepalese river is given below: 10

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow (m3/s)	199	125	140	270	310	1521	1950	2456	1930	808	488	318

The effective head and overall efficiency of the plant are 100 m and 85% respectively and can be assumed constant. Based on these data,

(i) How do you determine the installed capacity of such plant

(ii) If the design discharge of the plant is set to 1000 m3/s, calculate annual firm and secondary energy produced by the plant

2(a) Explain the causes of failure of earthen dam. 6

(b) For a concrete gravity darn as shown in figure below, calculate. 10

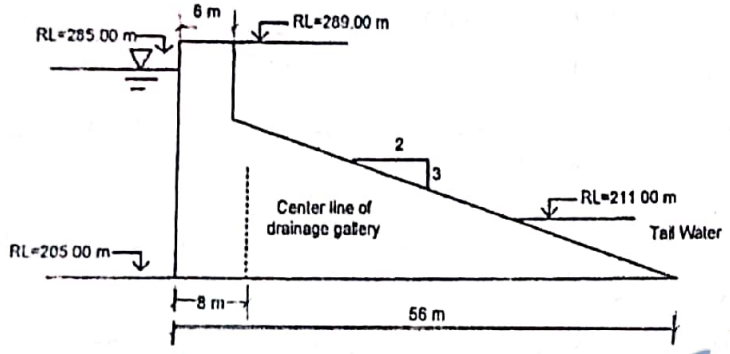
(i) The total vertical forces acting on the dam.

(ii) The total horizontal forces acting on the dam.

(iii) Factor of safety against sliding and overturning.

Contd. ...

Take $\mu = 0.70$ and $\gamma_{concrete} = 23.5 KN/m3$, $\gamma_{water} = 9.81\ KN/m3$



3(a) Write short notes on: 4+4

(i) Pump storage plants (ii) Hydraulic tunnel

(b) Design a setting basin to remove particle size greater than 0.5mm diameter from the water carrying mainly sand having design discharge of 5 cumecs. Take settling velocity as 7 cm/sec and if turbulence is considered, what is the dimension of basin? 8

4(a) Illustrate the working principle of governer, briefly. Mention the importance of tail water depth. 6+2

(b) A penstock of discharge capacity of 5 m^3/s is to be functioned in hydropower station with a design head of 50 m. determine the economic diameter of the penstock. Take overall efficiency of the plant at 85%. 8

5(a) What do you mean by pump? Classify the types of pump. Explain about the reciprocating pump and its working principle. 2+2+4

(b) A reaction turbine is working under a head of 9 m and average discharge of 11200 liters/s for a generator speed of 200 rpm. What is its specific speed? Assume overall efficiency of turbine is 92%. 8

6(a) Define energy dissipaters. Explain briefly the types of energy dissipaters? 2+6

(b) The following information is available regarding the relationship between trap efficiency. 8

Capacity in flow ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Trap efficiency	87	93	95	95.5	96	96.5	97	97	97.5	97.5

Find the probable life of the reservoir with an initial reservoir capacity of 30 million m^3 and the annual average sediment inflow is 2,00,000 metric tons with the average annual flood inflow of 60 million m^3. Assume a specific weight of the sediment equal to 1.2 g/cc. the usual life of the reservoir will terminate when 80% of its initial capacity is filled with sediment. Find the life period for each 20% filling up of the reservoir with the sediment.

PURBANCHAL UNIVERSITY

2017

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG453CI: Hydropower Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Explain the RoR. and storage type of the hydropower project. Focus your explanation on when these projects are run in the power system. 6

(b) Analyzing the long term flow, the long term mean monthly flow of Tadikhola flowing in Nuwakot District is listed to be 4.21, 2.92, 2.14, 1.55, 2.92, 4.86, 21.02; 38.8; 32.33; 16.17; 7.76; 5.82 m^3/s from January to December. The downstream release is fixed to be 10% of driest monthly flow. 2+2+3+3

(i) What is the design discharge when it is set to be at 40% exceedance?

(ii) If the net head is 300 m, plant efficiency is 85%; what will be the installed capacity of the project?

(iii) What is the firm power, firm energy and secondary energy?

(iv) Compute the volume of the reservoir required to maintain the deficit of 100MW firm power in the power system.

2(a) Explain in brief different causes of failure of earthen dam. 6

(b) Determine the factor of safety against overturning and sliding for the given dam section. Is there any tension along the base? Take the angle of friction to be 35°, unit weight of concrete 24 KN/m^3; shear strength of the material at horizontal section is 1350 KN/m^2. 10

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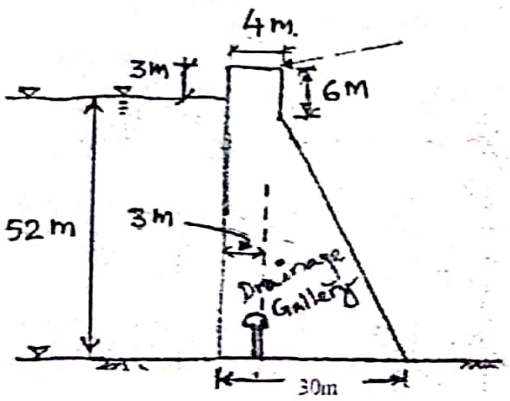


3(a) The daily load curve of a certain village is estimated as follows.

Time (hr)	0-4	4-7	7-9	9-11	11-4	4-6	6-8	8-10	10-12
Load (MW)	10	14	18	16	13	15	18	20	12

The above load is supplied by a power plant with a design discharge of 19.8 m^3/s; operating head of 150m and efficiency of 81%. Compute the load factor, capacity factor, utilizaton factor and reserve factor. 1.5×4=6

(b) What are surge tank and forebay? Explain their applicability and importance in the hydropower plant. 2+2

(c) Define the energy dissipaters and its necessity. What are the common type of energy dissipaters used in hydropower? Explain briefly with figures. 2+4

4(a) Explain the basic requirements of an ideal intake? Why side intake is mostly adopted in Nepal? Explain the role of tail water depth. 4+2+2

(b) Design a settling basin for a hydropower plant using simple settling theory with following data: Design Discharge = 5m^3/s. Target particle = 0.2mm, Temperature = 25°C. and kinematic viscosity of water at 25°C= 0.897 centistokes. Take the initial depth of the basin as 3.5m and consider the effect of turbulence also. 8

5(a) What is mass curve? Differentiate it with flow duration curve

(b) List out the progress hydrological studies in different level study of hydropower project.

(c) Design a pelton turbine for a high head power plant with following features. Design Discharge = 5.85m3/s, net head 302.5m, overall efficiency = 85%, coefficient of velocity of nozzl 0.98, speed ratio = 0.45. (Assume suitable jet ratio)

6(a) Explain with major differences: 3.5
(i) Impulse Turbine and Reaction Turbine
(ii) Centrifugal Pump and Reciprocating Pump

(b) What is draft tube? Explain its importance and function.

(c) A steel penstock 60cm diameter has the thickness 1.2cm. pipe is required to be designed to carry a discharge of 0.6 m Determine the water hammer head, pressure rise due to sud closure of the valve using various theory.

PURBANCHAL UNIVERSITY
2016

B.E. (Civil)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG453CI: Hydropower Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Explain the main characteristics of pumped storage hydropower projects with conditions for their development? 8

(b) When a run-off river plant operates as a peak load station with a daily load factor of 25%, all its capacity is firm capacity. What will be the minimum flow in river so that the station may serve as the base load station? It is given that: 8

Rated installed capacity of generator = 10MW
Operating head = 15m
Plant efficiency = 80%

2(a) Mention the major studies and investigation camed out during prefeasibility and feasibility studies, also discuss about detail project report. 6

(b) Calculate total energy production and total revenue generated from a ROR type hydropower project of gross head 200m constructed in Sunkoshi river taking design discharge corresponding to sixty percent of time exceedence having long term mean monthly flows (M^3/s) at the dam site from January to December are 6.0, 4.5, 3.0, 4.0, 5.5, 20.0, 35.0, 55.0, 30.0, 15.0, 8.0, and 7.0 respectively. Take conveyance efficiency, turbine efficiency, generator efficiency and transmission losses of the project are 90%, 95%, 99% and 12% respectively. Also consider minimum downstream release of $0.3m^3/s$ and average energy sale rate set up for the project in Power purchase agreement is NRs 5.50 per unit. 10

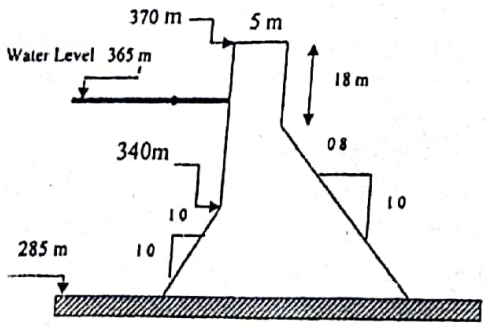
Contd. ...

3(a) Explain side intake, drop intake, frontal intake and Himalayan intake with their applicability conditions. 8

(b) A penstock carries $10m^3/s$ of water at head of 25m. The cost of pipe is given by 35 hd^2 Rupees per meter length where h and d denotes head and internal diameter of the penstock pipe. Annual fixed charges including investment and maintenance of the penstock pipe are 8% of the pipe line cost. If the coefficient of friction factor in Darcy's weisbach equation for the pipe flow in the penstock pipe is 0.025, overall electromechanical efficiency is 80% and setting power (energy) price is 70 NRs/KW/annum. Calculate the most economical diameter of the penstock for the project. 8

4(a) Explain different measure that can be applied to extend reservoir life of a hydropower project. 6

(b) Check Concrete gravity dam section as shown in figure proposed for 1200 MW Budhi Gandaki Reservoir type hydropower project in Dhading considering the major external forces only and taking friction coefficient (μ) between the base and foundation of the dam as 0.75, Coefficient of uplift pressure K as 0.4 and specific density of the dam material as 2400 kg /m^3, bearing or crushing strength and shearing strength of dam base foundation material are 30 kg/cm^2 and 3 kg/cm^2 respectively. 10



Note: Sketch is not in scale

5(a) Explain specific speed of turbines. Explain characteristics o of turbines?

(b) Length of spillway of a hydropower project is 70m and fo hydraulic jump for dissipation of energy below the spillway depth pre jump depth of 0.5m, to post jump depth of 3.2 stilling basin. Determine the design flood discharge of the way for the hydropower project.

6(a) Write short notes on any TWO:
(i) Governor and Generators
(ii) Stilling pool and settling basin
(iii) Emergency spillway and syphon spillway
(iv) Flow Duration Curve and Ripple Curve

(b) Design a pelton turbine for a hydropower Project with net h 350m head proposed - in Tamakoshi river. Proposed discharge of the pelton turbine is $3.5m^3/s$ and couple synchronous generator with ten (10) pairs of magnetic Take overall efficiency of electromechanical equipments 94%.

PURBANCHAL UNIVERSITY
2015

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG453CI: Hydropower Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Briefly explain hydropower development status in Nepal? Explain the major sources of energy in Nepal. 8

(b) Calculate the capacity for a reservoir with surface area of 1.0 km^2 for the following situation of stream flow supply and demand: 8

Month	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Mean monthly flow (m^3/S)	40	38	35	30	29	20	15	13	10	8	7	15
Rainfall (cm)	30	35	30	8	2	1	0	2	4	6	10	16
E_0 (cm)	12	8	7	9	5	4	4	5	10	11	13	15
Demand (ha m)	1500	2000	2700	4000	4800	4800	4600	4500	4500	2700	2500	1500

2(a) Describe the Main functions of Forebay and surge tanks. Explain the conditions when fore bay and surge tank can be avoided in hydropower project. 8

(b) Design a continuous type settling basin using simple settling theory to settle silts of size greater than 0.1 mm for design discharge of 10 in m^3/S with 4m depth of the basin. 8

3(a) Explain different conditions favorable for non rigid types of dam also explain the different types of non rigid dam failures with their remedial measures. 6

(b) Concrete gravity dam with specific gravity of 2.4 has the dimension as shown in figure below. Neglect all other forces except self weight, hydrostatic forces and uplift pressure. Take friction coefficient (μ) between the base and foundation of the dam 0.70, Coefficient of uplift pressure K as 0.3 and specific weight of the dam material as 2400 kg(f)/m^3, Check the dam for: 10

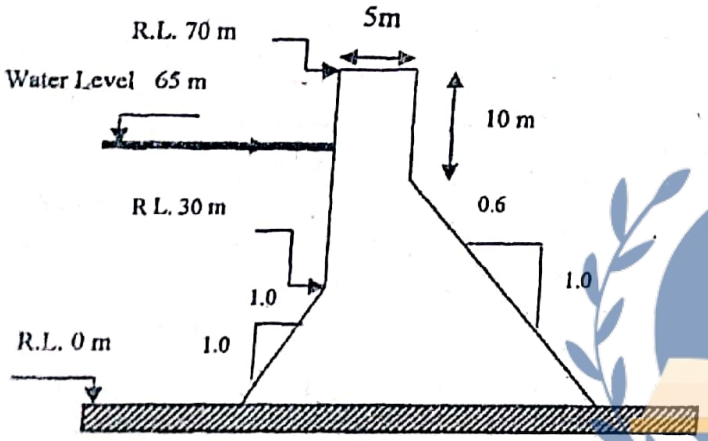
Contd. ...

(i) No tension exists anywhere along the base of dam

(ii) The dam is safe against sliding

(iii) The dam is safe against overturning

(iv) Dam material is safe against the crushing and shearing materials. The allowable crushing strength and shear strength of dam materials are 30 kg(f)/cm² and 5 kg (f)/cm² respectively.



Note: Sketch is not in scale

4(a) Explain different types of storage in reservoir also explain the reservoir sedimentation and life of the reservoir. 8

(b) A Kaplan turbine develops 3250 KW under a net head of 9.0m with overall efficiency of 87%. The draft tube has a diameter of 3.0 in at its inlet and has an efficiency of 78%. In order to avoid cavitations, the pressure head at the entry of the draft tube must not drop more than 5.0m below atmosphere. Calculate the maximum height at which the runner may be set above the tailrace level? 8

5(a) What do you mean by load factor, utilization factor and capacity factor? Show their relationship. 8

Contd. ...

(b) A concrete overflow dam has been designed to pass a flood of m^3/s in a downstream of a reservoir. The profile of dam permi head of 6.0 in over the crest. If the discharge coefficient is 0 approach velocity=0.8 m/s and dam crest height is 30m ab the river bed, determine the crest length to safely discharge flood flow with design of hydraulic jump stilling basin.

6(a) Write short notes on any TWO:

(i) Optimum economic diameter of penstock pipe

(ii) Specific speed of Turbines and their efficiency

(iii) Side intake, frontal intake anal drop intake

(b) Explain Centrifugal pump and reciprocating pumps with specific features. The diameter of an impeller of a centri pump at inlet and outlet are 10 cm and 20cm respecti Determine the minimum starting speed of the pump if it against a head of 25m.

PURBANCHAL UNIVERSITY

2014

B.E. (Civil)/Eighth Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG457CI: Hydropower Engineering

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Sketch properly wherever required. Assume necessary data appropriately if required.

Answer FIVE questions. 5×16=80

1(a) Describe the potential of hydropower development in Nepal. What are the major problems and challenges in its development? Suggest the government of Nepal for hydropower development smoothly. 4+3+3=10

(b) A run-off type hydropower plant is installed with 4 units of generators of 35.0 MW capacity of each. With the following data, calculate the average load, capacity factor and utilization factor for the plant. 2+2+2=6

Peak load = 1.2×10^5 kW and load factor = 0.85.

2(a) List and describe the components of typical hydropower project with neat sketch. 2+4=6

(b) A hydropower site is identified with an effective height of 75m and average monthly flows (m^3/s) of a river from January to December in sequence observed are: 162, 134, 125, 115, 180, 423, 1033, 1250, 1085, 715, 374, 195.

For the design discharge of Q_{40}, Environmental discharge 10% and overall efficiency of the plant 86%, calculate: 3+3+4=10

(i) Installed capacity

(ii) Annual firm power and energy and secondary energy

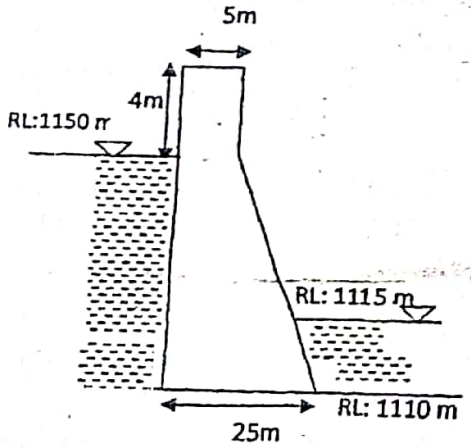
(iii) Storage required to produce firm power corresponding to Q_{20}.

Contd. ...

3(a) What is phreatic line in a dam? Derive a relation of seepage discharge through a dam with impervious foundation. 2+4=6

(b) A concrete dam is proposed as in the Figure and it is required to check its stabilities and safety factors and recommend your suggestion for the best construction. 10

Unit weight of concrete=24 KN/m³, Unit shear resistance = 500KN/m², Angle of shear resistance = 34⁰, bearing capacity of dam material and foundation 200kg/cm², friction coefficient μ=0.6 and permeability coefficient of foundation K = 0.6. Assume suitable values for confidents if required.



4(a) Introduce intake and its functions in hydropower projects. What are the types of tunnels used in hydropower project? Illustrate. 4+4=8

(b) Design two chambered settling basin for design discharge $Q_{40}=10m^3/s$ hydropower project with following data-using (i) settling velocity theory. (ii) trap efficiency approach and (iii) probability approach considering shear velocity also in the settling basin.

(i) Desired particle size to settle is greater than 0.2mm.

(ii) Desired trap efficiency of the settling basin = 90%

Contd. ...

(iii) Additional discharge for flushing in continuous settling ba = 10% of the design discharge.

(iv) Depth of the settling basin = 5.5m.

(v) Assume additional data suitably if needed to be design basin.

Calculate the detention time and the trap efficiency of the settl basin.

5(a) Describe the methods for determination of optimum econo diameter of penstock pipe.

(b) Why energy dissipater is required? Explain use of roller bucke type energy dissipatater in hydropower.

(c) Find the discharge over the ogee spillway-with the following da Head of water over the crest=3m, length of weir= 90m, Height the crest above the base of the approach channel=10m, width the approach channel= 90m, discharge coefficient=2.5.

6(a) Explain different types power house and its components bri Explain the procedures to determine size of power house. 3+3

(b) What is draft tube? Write its function in hydropower scheme 1+3

(c) Installed capacity of a hydropower project is 29.8 MW and 140m net head for 26m³/s design discharge, two Francis turbi is used. **Calculate:** 2+2+2=

(i) Electromechanical efficiency of turbine if generator efficiency is 95%.

(ii) Specific speed of the turbine, and

(iii) Setting height of the turbine if efficiency of the draft tube 85% and velocity of flow in Tailrace channel is 0.2m/s

PURBANCHAL UNIVERSITY
2013

B.E. (Civil)/Eighth Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG457CI: Hydropower Engineering

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Sketch properly wherever required. Assume necessary data appropriately if required.

Answer FIVE questions.

1(a) Briefly describe the power system of Nepal with its components. 8

(b) Find the load factor, capacity factor and utilization factor of a stand by thermal power plant having a capacity of 200 MW to supply power at the time greater than 700 MW in Power system of Nepal at the following situation: 8

Time (hr)	0-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24
Load (MW)	500	700	800	875	900	850	825	875	800	600

2(a) Explain briefly about different types of storage in a reservoir. 8

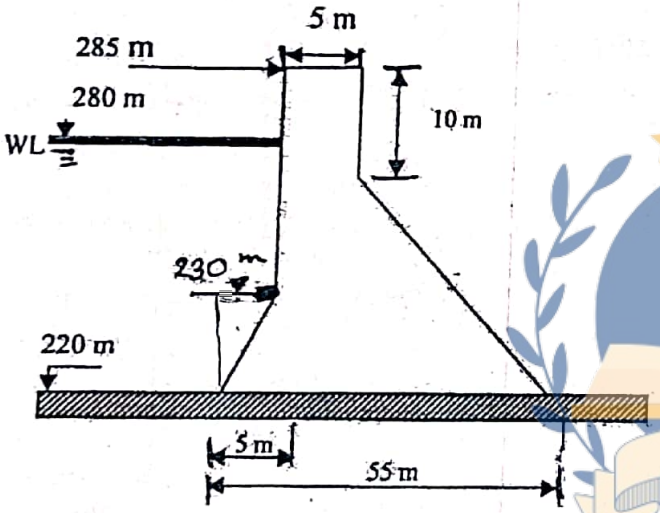
(b) A proposed reservoir has a capacity of 400 ha-m. The catchment area is 120 km², and the annual stream flow averages 10 cm of runoff over the catchment. If the annual sediment production is 0.03 ha-m/km², what is the probable life of the reservoir? Take the relationship between trap efficiency (η) and capacity inflow ratio (C/I) as given below. 8

Capacity Inflow ratio (C/I)	0.27	0.30	0.33	0.36	0.4
Trap efficiency (η) %	93	94	95	96	98

3(a) Show that the principal stress developed the toe of the straight gravity (elementary profile) dam retaining water depth H is higher than the vertical stress that was developed at the toe of foundation. 4

Contd. ...

(b) A concrete gravity dam has "the dimension as shown in the figure below. Neglect all other forces except self weight, hydrostati- pressure and uplift pressure. Take uplift pressure intensity K = 0.6, coefficient of friction between the dam base and foundation = 0.75, and specific gravity of dam material (G) = 2.4. Allowable crushing and shear strength of the dam, foundation material are 40 kg/cm² and 8 kg/cm² respectively. Check stability and safety of the dam design. 12



Note: Sketch is not in scale

4(a) What are the requirements of intake? Explain the different types of intake with conditions of their suitability commonly used in hydropower projects. 8

(b) What is the maximum permissible velocity of flow and the discharge in a cast iron pipe of 250 mm diameter and 15 mm thick, which can be suddenly stopped by a valve at the outlet end of the pipe without letting the rise of water hammer pressure in the pipe not to exceed 2.545 × 10^{-3} KN/m² taking E = 123.608 × 10^9 N/m² and K = 206.01 × 10^7 N/m². 8

5(a) What are the design considerations for a spillway? Write down the occurrence of cavitations phenomena in a spillway. 6

Contd. ...

(b) A powerhouse is equipped with 4 units of vertical shaft pel turbines to be coupled with 70000 KVA 3 phase 50 he generators. The generators are provided with 10 pairs of po The gross design head is 505m and transmission efficiency headrace tunnel and penstock together is 94%. If four ur together will provide total power of 350000 hP at the guarant efficiency of 91% and the nozzle efficiency of 0.98 then specific speed of the turbine, jet diameter and number of j nozzle tip diameter, pitch circle diameter and number of buck on the wheel.

6(a) Write short notes on: 2×4
(i) Surge tank and forebay
(ii) Settling basin and stilling basin

(b) Design a settling basin using simple settling theory for high h plant. The desander should serve to remove particle size gre than 0.2 mm diameter. The design discharge is 4 m³/s and depth of tank is 4.0m. Assume temperature as 2 G = 2.65 and Kinematic viscosity of water = 0.9 cents stokes.

PURBANCHAL UNIVERSITY
2013

B.E. (Civil)/Eighth Semester/Chance

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG457CI: Hydropower Engineering

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Sketch properly wherever required. Assume necessary data appropriately if required.

Answer FIVE questions.

1(a) Define hydropower. Explain different types of power potential. Write down about power situation in Nepal, briefly. 2+3+5

(b) When a run-off-river plant operates as a peak load station with a daily load factor of 20%, all its capacity is firm capacity. What will be the minimum flow in the river so that the station may serve as the base load station? It is given that:
Rated installed capacity of generator = 10 MW.
Operating head = 15 m.
Plant efficiency = 80% 6

2(a) What are the components of hydropower plant? Show them with a neat sketch? 6

(b) The average monthly flows (m^3/sec) of a river from January to December are: 180, 158, 142, 130, 190, 443, 1065, 1270, 1105, 745, 390, and 213 respectively. The effective head is 105 m and overall efficiency of the plant is 88%. The design discharge of the plant has been set to Q_{65}. Based on these data, answer the followings: 10

(i) What is the installed capacity of the plant?

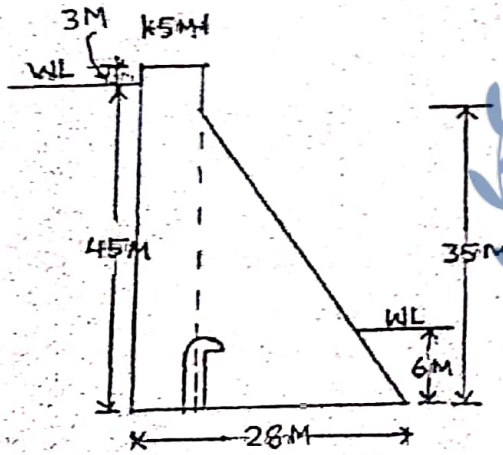
(ii) What are the annual firm power, annual firm energy and the secondary energy produced by the plant?

(iii) If the deficit in the firm power in the present power system is 125 MW, what is the required storage capacity of a reservoir to satisfy the demand?

Contd. ...

3. A concrete gravity dam is constructed as shown in figure below. Determine:
   (i) Factor of safety against overturning,
   (ii) Factor of safety against sliding,
   (iii) Maximum vertical stress, shear stress and normal stress at the toe,
   (iv) Is there any tension?

   Consider only the major forces acting on the dam. Check for the reservoir full condition. Assume unit weight of concrete and water are 24 KN/M³, 10 KN/M³ respectively, average shear strength of material at horizontal section is 1400 KN /M², and coefficient of friction is 0.75. 16



4(a) What is economical diameter of penstock pipe? How would you determine the economical diameter of penstock pipe, analytically? 8

(b) Design a forebay structure for a run-off-river hydropower plant having design discharge of 3.5 cumec and storage capacity required for 2 minutes power generation. The plant has 75 m long penstock pipe of 1.1 m diameter. Assume that the velocity of flow through the forebay is 0.2 m/sec. 8

Contd. ...

5(a) What is energy dissipator? Explain different types of energy dissipator with necessary sketches?

(b) What do you mean by a tunnel? Why it is important? Write down their classification

6(a) What is pump? Write down the classification of pump? Explain the working principle of centrifugal pump with necessary sketch, briefly?

(b) Design the size of the Francis turbine for the hydropower having design discharge of 120 cumec and operating head 45 m. The overall efficiency of the plant is 93%? Assume suitable data if necessary.

PURBANCHAL UNIVERSITY
2012

B.E. (Civil)/Eighth Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG457CI: Hydropower Engineering

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Sketch properly wherever required. Assume necessary data appropriately if required.

Answer FIVE questions.

1 [a] Illustrate the classification of hydropower plants, briefly? 8

[b] A hydropower plant has an installed capacity of 60 MW. The yearly output of the plant is 300×10^6 KWh. If the peak load is 50,000-KW, determine: 2+2+2

(i) Annual load factor

(ii) Plant use factor and

(iii) Capacity factor

[c] Explain the role of tail water depth (TWD)? 2

2 [a] What do you understand by flow duration curve and mass curve? Write down the application of these curves with necessary sketches? 8

[b] Design a settling basin with considerations of Turbulence approach, Probability approach (M.A. Velikanov) and Trap efficiency (Vetter's method) for the given data: 8

Discharge = 7.5 cumec, Particle size to settle = 0.2 mm, Kinematic viscosity=$1.32 \times 10^{-6} m^2/sec$, removal ratio = 95%.

3. For the gravity dam shown in figure, determine: 16

(i) Factor of safety against overturning

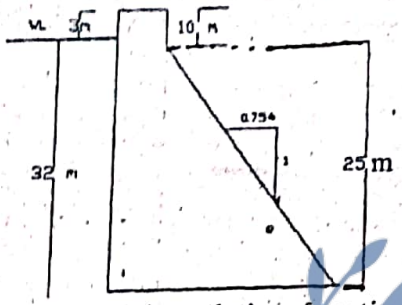
(ii) Factor of safety against sliding,

(iii) Maximum vertical stress, shear stress and normal stress at the toe,

(iv) is there any tension?

Contd. ...

Consider only the major forces acting on the dam. Check for the reservoir full condition. Assume unit weight of concrete and water are 24 KN/M³, 10KN/M³ respectively, average shear strength of material at horizontal section is 1400 KN/M², and coefficient of friction is 0.75.



4 [a] What is intake? Explain their functions? Also demonstrate the types of intakes to be used in hydropower projects, briefly? 1+1+6

(b) The discharge is conveyed at a rate of 60 cumec from a reservoir for power generation. The length of the tunnel is 7.8 km and diameter of tunnel is 6.5 m. Three penstocks of diameter 1.5 m and length 450 m each are used between surge chamber and turbines. If the water surface elevation difference between reservoir and tail water level is 250 m, coefficient of friction for tunnel is 0.028 and for penstock is 0.016, determine:

(i) the required cross sectional area of the surge tank
(ii) the maximum upsurge and
(iii) the maximum downsurge

5 [a] What is spillway? Describe their functions? List out the different types of spillway? Explain about shaft spillway with necessary sketches? 1+1+2+4

(b) Derive the relationship for estimation of water power potential theoretically? 4

Contd. ...

(c) How can seepage controlled in an embankment dam explain briefly.

6 [a] Distinguish between impulse turbine and reaction turbin in tabular form. Write down the main function governor?

(b) A Kaplan turbine develops 2250 KW under a net head of m and with overall efficiency 87%. The draft tube has diameter of 2.8 m at its inlet and has an efficiency of 78 In order to avoid cavitation, the pressure head at ent to the draft tube must not drop more than 4.5 m bel atmosphere. Calculate the maximum height at which runner may be set above the tail race level?

PURBANCHAL UNIVERSITY
2018

B.E. (Civil)/Seventh Semester/*Final*

Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

BEG490MS: Applied Sociology *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions. **5×8=40**

1. Define sociology. Explain the application of sociology in addressing current social issues in Nepal.
2. What do you mean by community development? Write down the approaches of community development.
3. Define socialization. Describe the role of various agents in the process of socialization.
4. Define caste and discuss its impact upon Nepalese society.
5. Define social structure and discuss its components.
7. What do you mean by status and role? How they are interrelated? Explain.

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Chance*

Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

BEG490MS: Applied Sociology *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions. 5×8=40

1. Define sociology. Show the relationship of sociology with History and Economics.
2. Clear the concept of ethnicity and distinguish it from caste.
3. How Nepalese societies have been stratified? Illustrate with the various bases.
4. Give a brief introduction about major religions of Nepal.
5. Describe approaches of community development in brief.
6. What is socialization? Discuss about the agencies of socialization.
7. Why Lichhabi period is known as golden period in Nepalese history?

PURBANCHAL UNIVERSITY

2017

B.E. (Civil)/Seventh Semester/*Final*

Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

BEG490MS: Applied Sociology *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions. 5×8=40

1. Discuss application of sociology in addressing contemporary social issues in Nepal.

2. Define social control. Describe the need and agencies of social control.

3. Define ethnicity and discuss its role in present day Nepal.

4. Explain political dimension of Nepalese society and culture briefly.

5. Define community development and discuss the role of civil engineer in community development.

6. Define social process and discuss the causes of social and cultural change.

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Final*

Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

BEG490MS: Applied Sociology *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions. 5×8=40

1. Define Sociology. Trace out the Evolution of Sociology.
2. Describe about religions and festivals in Nepal.
3. Clear the concept of Socialization.
4. What do you know about caste system in Nepal?
5. What do you mean by community development? Explain.
6. "Co-operation and conflict are two sides of same coin." Discuss.

PURBANCHAL UNIVERSITY
2016

B.E. (Civil)/Seventh Semester/*Chance*

Time: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

BEG490MS: Applied Sociology *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions. 5x8=40

1. Justify the application of sociological knowledge in addressing social issues in Nepal

2. Define ethnic group. Discuss the role of ethnicity in nation building process.

3. What is social control? Why social control is required to maintain social order? Explain.

4. Define community development and discuss the role of civil engineer in community development.

5. Discuss various social problems of Nepal with its probable solution.

6. Significantly examine the role of indigenous technology and use of appropriate technology.

7. "Community participation is must for community development." Explain with examples.

PURBANCHAL UNIVERSITY
2015

.E. (Civil)/Seventh Semester/*Final*

ime: 01:30 hrs. Full Marks: 40 /Pass Marks: 16

EG490MS: Applied Sociology *(New Course)*

Candidates are required to give their answers in their own words as far s practicable.

ll questions carry equal marks. The marks allotted for each sub-question s specified along its side.

nswer ALL questions.

. Define Sociology. Discuss the importance of sociology in the study of engineering fields. 8

. Distinguish among Tribe caste and ethnicity. 8

. What do you mean by Social Control? Illustrate the agencies and the importance of social control in human society. 8

. What is Caste System? Show how Nepalese society is stratified on the basis of caste. 8

Or

Why Lichchhivi period is known as the golden period in Nepal? Explain.

. Define community development and explain the role of people in community development. 8

PURBANCHAL UNIVERSITY
2018

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG492MS: Construction Project Management *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) What is construction management? Explain importance of construction management. And define characteristics of construction industry. 8

(b) List down the characteristics of a project. Discuss about planning phase. 3+5

2(a) What is bidding and bidding process? Explain project crashing. 4+4

(b) Explain about various methods of claim management in construction projects. 8

3(a) What is critical path? Explain its role in network diagram. 4

(b) Draw a network diagram for the following project whose activities and their durations are as follows: and find critical path, critical activities, non critical path and non critical activities, project completion time and EST, EFT, LST, LFT and Total float. 12

Activity	Predecessors	Duration (days)
A	-	4
B	A	5
C	B	3
D	A	4
E	-	5
F	E	3
G	D,F	6
H	E	5
I	D,F	4
J	H,I	5
K	C,G,J	4

Contd

4(a) What is equipment? Why we use construction equipment in the construction projects? What are the equipments used in the highway and pavement construction projects? Explain with neat sketches. 8

(b) What is performance management? Explain performance issues and factors affecting project success. 8

5(a) What do you mean by leadership? Explain briefly leadership styles. 8

(b) What is a construction contract? Explain about different conditions of contract. 8

6. Write short notes on any FOUR. 4×4=16

(a) Health and safety

(b) Work breakdown structure

(c) Resource management

(d) Motivation

(e) Estimating methods

(f) Elements of valid contract

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG492MS: Construction Project Management *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Explain nature and characteristics of construction project management. Also describe styles and approaches of leadership. Are leaders born or made? 8

(b) Describe all the four phases of project life cycle in brief and explain why project implementation phase is the most important? 8

2(a) Explain contract. Describe elements and types of contract in detail. 8

(b) Describe Tender and Tender process in construction project industry. 8

3(a) List different element of cost estimation and explain in detail about estimating method. 8

(b) Discuss different equipments for excavation, filling, transportation and compaction. 8

4(a) Find the critical path/critical activities, minimum completion time of the project, Es, EF, Ls, LF, TF, FF and IF . 8

Activity	Predecessors	Duration (days)
A	None	2
B	None	3
C	None	4
D	A	5
E	D, B	6
F	C	7
G	B, E	8
H	F	9
I	G, H	10

Contd. ...

5(a) Explain performance measurement tools. Describe modern and traditional tools of performance in detail and explain objective of performance measurement tools. 8

(b) Describe Maslow's and Herzberg theories of motivation. Also describe differences between Maslow's and Herzberg theory. 8

6. Write short notes on any FOUR: 4×4=16

(a) Risk management

(b) Work Breakdown Structure (WBS)

(c) Tools of TQM

(d) Project Environment

(e) Project proposal

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG492MS: Construction Project Management *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) What do you mean by construction management? Explain its importance in the context of construction industry of Nepal. 8

(b) Define project and its characteristics. 8

Or

What do you mean by project management? Explain the functions of project management.

2(a) Define elements of cost estimation and methods of cost estimation. 8

(b) Describe Gantt/Bar chart, function of planning, Tools of planning and merits and demerits of Gantt/Bar chart. 8

3(a) Differentiate between CPM and PERT. 4

(b) Draw a Network diagram from the following project whose activities and their durations are as follows and find critical path, critical activities and project completion time and EST, EFT, LST, LFT, TF, FF and IF. 12

Activity	Predecessors	Duration (days)
A	-	5
B	-	8
C	-	9
D	B	7
E	B	5
F	B	6
G	A,D	8
H	A,D,E	4
I	C,F	8
J	G,H	9
K	I	7

Contd. ...

4(a) What do you mean by construction procurement? Explain procurement strategies. 8

(b) Describe the equipments used in highway and pavement constructions. Explain the uses of any five equipments in highway construction with neat sketches. 8

5(a) What do you mean by management? Explain the principles of management. 8

(b) Define total quality management and key indicators of performance. 8

6. Write short notes on any FOUR. 4×4=16

(a) Risk Management
(b) Personnel Selection
(c) Project Life Cycle
(d) Equipment for Tunnel Construction
(e) Leadership Style

PURBANCHAL UNIVERSITY

2016

B.E. (Civil)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG492MS: Construction Project Management *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Explain nature and characteristics of construction project industry. Describe principles of management briefly. 8

(b) Describe project implementation and termination phase and explain why project implementation is the most important. 8

2(a) Explain cost control, types of cost control , feedback control and cost control cycle. 8

(b) Define Project finance. List out all project delivery methods. Define DB, turnkey and BOOT contract. 1+1+6

3(a) Prepare a three level WBS of any civil engineering project. Differentiate CPM and PERT. 2+2

(b) Find critical path, critical activities, EST, EFT, LFT, LST, TF, FF, IND.F, INT.F of given problem below. 12

Activity	Predecessors	Duration (days)
A	None	8
B	None	6
C	None	8
D	A	9
E	A	10
F	B, D	13
G	C	11
H	C	10
I	F, G	10

Contd. ...

Also calculate minimum completion time of the project.

4(a) State advantages of using Construction Equipment. Explain the basis for equipment selection. Define Tower crane, concrete batching and mixing plant. 2+2+4

(b) Define variables for measuring project performance. What are causes of project delays in Nepal? Define Key performance indicators in construction. 3+2+3

5(a) Define Leadership and its Styles. Briefly explain Maslow's hierarchy of Needs for motivation theory. 3+5

(b) Explain in brief about Knowledge management. Define in brief on risk management and Total Quality management? 4+2+2

6. Write short notes on any FOUR. 4×4=16

(a) Benchmarking
(b) Claim and dispute in construction
(c) Cost plus contract
(d) Resource allocation and aggregation
(e) Bar chart

PURBANCHAL UNIVERSITY

2015

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG492MS: Construction Project Management *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1. List down the characteristics of construction industries? Discuss the infrastructure domestic construction market highlighting the major sectors and prospects of Nepalese construction industry. 2+6

2. Define construction project. Elaborate the project life cycle phases in detail. 2+6

3. "If you fail to plan, you are bound to fail", justify this statement highlighting the objectives and principles of planning. List down the scope related parameters in construction project. 6+2

4(a) Prepare the three level WBS of any construction project. List down the advantages and limitations of Bar-chart. 3+3

(b) Find all the components of given CPM network problem. 10

Activity	Duration (days)	Predecessor
A	2	-
B	5	-
C	3	-
D	4	A, B
E	2	A, B
F	4	D
G	I	D, E
H	3	B, C
I	2	B, C
J	3	F, G, H

Contd. ...

5. On what basis of characteristics engineering contracts are classified? List down all types of contract. Elaborate the cost plus types of contract in detail. 3+5

6. Discuss the equipment for concrete hatching and mixing. Define tower crane. 6+2

Or

Explain the method and equipment of tunnel construction. Define sheep footed roller.

7. What is performance, stands for? Define the tools for its measurement. Why most of the governmental projects in Nepal are time and cost overrun? 4+4

8. List down all 14 principles of administrative management theory and explain any seven of them. 3+5

Or

List down the types of leadership in project. What are characteristics of a good leader? Which leadership style is better to manage the construction project in Nepal, why? 2+2+4

9. Explain the term benchmarking. Discuss the risk management process in construction project with flow chart. 3+5

Or

Define the term financial management in a project. How claims and disputes in construction project are resolved? Elaborate. 3+5

PURBANCHAL UNIVERSITY
2014

B.E. (Civil)/Eighth Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG496MS: Construction Management

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume necessary data appropriately if required.

Answer FIVE questions.

1(a) What are the construction execution methods? Explain briefly. 8

(b) What do you mean by specification? Explain the types of specification. 8

2(a) What is contract? Explain briefly the essential elements for valid contract. 8

(b) Describe procedure to evaluate tender and selection of contractor. 8

3(a) Define measurement book (MB) and its uses in the construction project. 8

(b) Why Critical Path Method (CPM) and Programme, Evaluation and Review Technique (PERT) are considered as effective planning tools in construction project? Explain briefly. 8

4(a) What is recruitment? Explain briefly the procedures of material procurement. 8

(b) What are the different types of project maintenance? Explain the importance of project management? 8

5(a) Describe in your words the safety arrangements for using the equipment, especially for hydropower construction projects. 8

(b) What is earned value? Explain how earned value analysis is done in the construction project and also explain the importance of EVA. 8

6(a) What do you mean by leadership? Explain briefly the leadership style of autocratic, democratic and free rein. 8

(b) Write short notes on any TWO: [4+4]

(i) Profit and losses
(ii) Time cost trade off.
(iii) Trade Union
(iv) Muster Roll

PURBANCHAL UNIVERSITY
2013

B.E. (Civil)/Eighth Semester/Chance
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG496MS: Construction Management

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume necessary data appropriately if required.

Answer FIVE questions.

1(a) What do you mean by construction? Explain briefly the importance of construction management in execution of the construction project. 8

(b) What are the types of specification? Explain the importance of specification in construction projects. 8

2(a) What do you mean by tender, tender document, tender notice? Explain the causes of tender invalid. 8

(b) What do you mean by Measurement Book (MB)? Explain the uses of MB in construction projects. 8

3(a) What are the equipments used in highway and pavement construction projects? Explain their uses in construction works with neat sketches. 8

(b) Define analytically critical path, critical activities, dummy activities and floats with suitable example. 8

5(a) What are types of project maintenance? Explain the importance of project maintenance in construction projects 8

(b) What do you mean by leadership? Explain qualities of leader and differentiate between leader and manager. 8

4(a) What do you mean by earned value analysis (EVA)? Explain the importance of EVA in construction projects. 4

(b) Draw a network diagram from the following information given below and also find EST, EFT, LST, LFT, TF and FF. 12

Contd. ...

Activities	Duration [days]	Predecessor
A	3	-
B	5	-
C	8	A
D	9	A
E	4	A, B
F	6	D, J
G	12	E
H	9	C
I	4	H, F, G
J	6	A, B

6. Write short notes on any TWO: 2×8=16

(a) Importance of record keeping for construction and maintenance

(b) Maslow's hierarchy of needs theory

(c) Building codes quality control

PURBANCHAL UNIVERSITY

2012

B.E. (Civil)/Eighth Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG496MS: Construction Management

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume necessary data appropriately if required.

Answer FIVE questions.

1.(a) What are the construction execution methods? Explain briefly. 8

(b) What do you mean by specification? Explain the types of specification. 8

2(a) What is contract? Explain briefly the procedures of selection of contractor. 8

(b) What do you understand by Tender, Tender notice, Tender guarantee and Tender Document? Explain briefly. 8

3(a) What is Construction Scheduling? Explain about the scheduling techniques. 8

(b) An Engineering construction activity had 10 days duration and was expected to cost $200,000. Set into the project and prior to finishing an activity, the following data were obtained about the progress done to that activity: Have so far worked for 6 days on the activity. Only 40% of an activity has been completed and $120,000 has already spent on the construction. Perform earned value analysis and comment on the result. 8

4(a) What is selection of personnel? Explain briefly the procedures of personnel selection. 8

(b) What are the different types of project maintenance used in project management? Explain briefly. 8

Contd. ...

5(a) List out the different types of equipments used in excavation and describe any five types of equipment with the help of neat sketches. 2

(b) Why cash flow diagram is important for any construction project? Explain. 2

6(a) What do you mean by management? Explain briefly the leadership style of autocratic, democratic and free rein. 2

(b) Write short notes on any TWO: 4×4

(i) Balance Sheet

(ii) Duties of site Supervisor

(iii) Importance of receipt in calculating taxes

(iv) Field order book and Measurement book

PURBANCHAL UNIVERSITY

2018

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG451CI: Design of RCC Structure *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume required data suitable if necessary. ***IS456-2000, IS1343*** *and* ***Design Aids for IS456*** *are allowed to use.*

Answer FOUR questions.

1(a) A singly reinforced concrete beam 40cm×60cm has a 8 cm wide and 8cm deep groove in the compression side [Fig. 1(a)] and 3-25 mm diameter reinforcement. Determine: (i) position of NA and (ii) maximum compression and tensile stresses when it is subjected to a bending moment of 80 kN-m. Take σ_{cbc}= 7 N/mm² and $\sigma_{st,per}$= 130 N/mm², m=13.33. 10

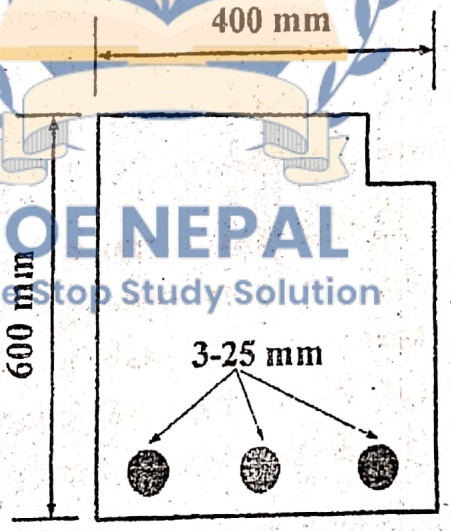


Fig. 1(a)

(b) According to IS 456: 2000 why over reinforced section is not designed. Design a beam of 230mm×300 in flexure when it is simply supported on masonry wall thickness 300mm 4m apart to support a live load of 10 kN/m and dead load of 8 kN/m including its own weight. Use M20 grade concrete and Fe415 steel bars. Check whether the design is over reinforced or not. 2+8

Contd

2(a) A tapered cantilever beam of width 300mm and span 3m need to support point load 85 kN at the free end and total UDL including self weight is 15 kN/m. The depth of beam is 300 mm at free end and 500mm at fixed end. Design shear reinforcement at section 1m from the support. It is provided with Fe415 tension reinforcement bars of 0.9%. Use M20 concrete and Fe250 for shear reinforcement. 10

(b) A column of diameter 400mm has an unsupported length of 3m and effective length of 3.6m. If it is subjected to axial load of 1200 kN/m and the moment about major axis 250 kN/m. Design a longitudinal reinforcement using M25 concrete and Fe500 Steel. Also design spiral reinforcement. 10

3. Design the roof slab for a hall of size 3m×10m clear in size using M20 concrete and Fe415 steel. The slab is simply resting on 230 mm thick brick wall all around. The super imposed working load is 7 kN/m². Perform necessary check to confirm the design is safe and draw reinforcement detailing in plan and section with necessary dimensions clearly. 20

4(a) A isolated RC footing has to transfer a service load of 1500 kN from a column of size 400×500mm with 8-20 diameter longitudinal bars. Design Isolated footing considering M20 concrete and TMT bars, given safe bearing capacity= 180 kN/m². Draw a neat diagram of reinforcement detailing. 10

(b) A beam of 150 mm wide and 300mm deep is prestressed by 5-straight wires of diameter 7mm carrying an initial prestressing force of 200 kN at eccentricity of 60mm. the modulus of elasticity of 2 10 kN/mm², fck 50 MPa. Find the percentage loss of stress in steel due to elastic deformation of concrete. If the age of loading is 28 days, E_s= 200,000 MPa, E_c= 35000 MPa, find out the losses of prestress due to creep, shrinkage and relaxation. Neglect the weight of the beam. (Assume other necessary data). 10

5. Write short notes on any FOUR:
(a) Working stress and limit state method
(b) Bar bending schedule with examples
(c) Load balancing concept
(d) Difference between pretensing method and post ten method

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG451CI: Design of RCC Structure *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume required data suitable if necessary. ***IS456-2000, IS1343*** *and* ***Design Aids for IS456*** *are allowed to use.*

Answer FOUR questions.

1(a) Differentiate working stress method and limit state method. Define characteristic load and strength. Why partial safety factor is used in limit state method of design. 6+2+2

(b) Determine the effective depth required by an RCC beam to resist a bending moment of 20KN-m. Also determine the area of tensile reinforcement needed using working state method. Take b=d/2. Use M20 concrete and Fe-415 steel. 10

2. Design a corner slab for a room of 5.5m×4.0m clear in size if the superimposed load 4KN/m2 and floor finish of 1KN/m^2. Use M20 concrete and Fe-415 steel. Assume the edges are simply supported and corners are not held down. Show the reinforcement detailing in diagram as well. 20

3(a) Design a simply supported beam having a cross sectional dimension of 300mm×500mm with 50mm effective cover in each sides subjected to design loads of M_u=110KN-m, V_u=100KN and T_u=30KN-m. Consider M20 concrete and Fe-415 steel. 12

(b) Design the shear reinforcement at the section where bent up is done, for a beam having unsupported length of 5.0m and support width 250mm subjected to the design load of 50KN/m including self weight and having sectional dimension 200mm×450mm (effective). 4-20Φ tensile reinforcement are provided two of which has been bent up at 800mm from the inner face of support. 2-20Φ compression reinforcep-icnt are provided. Use M20 concrete and Fe-415 steel. 8

Contd. ...

4(a) Design a column having a cross sectional dimension of 350mm×350mm, the unsupported centre to centre length is 4m, the factored moment in the column are M_{ux}=10KN-m, M_{uy} =70KN-m and the factored axial load P_u=1200KN. Use M25 concrete and Fe-415 steel. Take d'=35mm. 15

(b) Draw a neat sketch of a dog legged staircase with necessary reinforcement details. 5

5. Write short notes on any FOUR: 4×5=20

(a) Losses of pre stress

(b) Staircases

(c) Load balancing approach

(d) Pre-stressed concrete beam

(e) Flanged beams

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Final*
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG451CI: Design of RCC Structure *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume required data suitable if necessary. ***IS456-2000, IS1343*** *and* ***Design Aids for IS456*** *are allowed to use.*

Answer FOUR questions.

1(a) Explain different methods for designing RCC Structures. 8

(b) Design a simply supported rectangular beam for flexure, having effective span 5m which has to support a point load of 10KN acting at 4m from left support, in addition to its self-weight. A superimpose load of 13 KN/m also acts on the beam throughout. Take width of beam 230mm. Use M20 grade and Fe415 grade for design. 12

2(a) Design a column 500mm×500mm for an axial load of 600KN and the moment of 60KNm and 40KNm about X-X and Y-Y axes respectively. Assume M25 and Fe415. 10

(b) A M20 grade concrete rectangular beam of 230mm width and 450 mm effective depth has 3-12mm diameter bars at bottom and 2-12 mm numbers bars at top. If the total UDL of 30 KN/m acts on beam, Design for Shear, if required. 10

3. Design a slab for a room 5.5m x 4m effective in size, if the superimposed load and floor finish are $5KN/m^2$ and $1KN/m^2$ respectively. Adopt M20 and Fe415. Use IS code coefficients to design for flexure and shear, for slab edge simply supported-corners not held down. Sketch details properly. 14+6

4(a) A reinforced concrete footing is to be designed for a brick wall 40cm transmitting a load of 100 KN/m of its length. Bearing capacity of soil 60 KN/m^2. Unit weight of earth 15 KN/m^3. Use fck as 15MPa, Fy=250Mpa. 12

Contd. ...

(b) A beam of 400mm×600mm is prestressed by an effective force of 960KN. The section has an effective span of 6m and is subjected to a u.d.1 of 16KN/m including self-weight of beam. The prestressing tendons are located at 400mm below the top fiber. Determine the extreme fiber stresses in concrete at the mid-span section. Assume suitable materials. 8

5. Write short notes on any FOUR: 4×5=20

((a) Principle of Pre-stressed concrete analysis.

(b) Design steps of dog-legged R.C. staircase

(c) Design of flanged beam

(d) Modes of failure of column with reference to interactive curve

(e) Detailing of Beam and column junction.

(f) Development length

PURBANCHAL UNIVERSITY
2016

B.E. (Civil)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG451CI: Design of RCC Structure *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume required data suitable if necessary. IS456-2000 is allowed to use.

Answer **FOUR** questions.

1(a) Discuss the major differences between working stress method, ultimate load method and limit state method. 6

(b) Design a simply supported square two-way square slab supported on 250 mm wide supports at a distance of 4.5 m centre-centre. The slab is subjected to a live load of 4 kN/m² and a surface finish of 1 kN/m². Consider that the corners are held down. Use concrete of M25 grade and Fe500 steel. 14

2(a) Design a rectangular beam section 250 mm wide and 450 mm effective depth subjected to ultimate moment of 150 kNm, ultimate shear force of 50 KN and ultimate torsional moment of 40 kNm. Consider clear cover of 30 mm, concrete of grade M20 and Fe500 steel. 12

(b) A RC beam is simply supported with dead load 6 kN/m and live load 36 kN/m. The concrete is 20Mpa and steel is 415 Mpa. If the three bars used are 20mm diameter and are to be bent up at 45°. Design the shear reinforcement if the clear span of beam is 7m. 8

Size of Beam 300mm×550mm

Total number of Bars = 6 Nos.

3. Design a rectangular column biaxially eccentrically loaded deforming in single curvature . 20

Ultimate Axial load = 2000 KN.

Contd. ...

Ultimate Biaxial moment at bottom M_{ux1}=200KNm; M_{uy1}=105KNm

Ultimate Biaxial moment at Top M_{uy1}=160KNm; M_{uy2}=50KNm;

Length which is effective is 8.4m for X and 4.6m for Y.

Column section B×D=0.4×0.6m

Fe500 and M25

Draw lateral ties and reinforcement details.

4(a) An Isolated RC footing has to transfer a dead load of 1000 kN and imposed load of 700 kN at service state and uniaxial moment of 160 kNm at the bottom of the column from a circular column. Design footing considering f_{ck} = 20 MPa, f_y = 500 MPa, safe bearing capacity = 175 kN/m², Weight of soil = 18 kN/m³; angle of repose 33°. Draw a neat diagram of reinforcement detailing. 10

(b) A PSC beam of 0.12 m x 0.3 m is used over a span of 6m to support a UDL of 5kN/m excluding its self weight. The beam is prestressed by a straight cable carrying a force of 180kN & located at an eccentricity of 50mm. Determine the location of the thrust line in beam & plot its position at quarter & central span sections. 10

5. Write short notes on any FOUR: 4×5=20

(a) Detailing of Beam Column Junction

(b) Under-reinforced section over reinforced section

(c) Design of Dog-legged staircase.

(d) Partial safety factors and their significance

(e) Loss in prestress due to friction.

PURBANCHAL UNIVERSITY
2016

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG451CI: Design of RCC Structure *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume required data suitable if necessary. ***IS456-2000*** *is allowed to use.*

Answer FOUR questions.

1(a) What is the significance of considering load combination while designing Reinforced concrete structure. Define modular ratio. 2+2

(b) A simply supported beam of cross section dimension 250mm×500mm is subjected to uniformly distributed load of 20 kN/m including its self weight. The beam is reinforced with 3-18 mm diameter steel at distance of 50mm from the bottom of beam. Using working stress method, check if beam fails in flexure. 8

(c) A beam of cross section dimension 240mm×440mm with effective span of 5m is subjected to an Imposed load 28 kN/m excluding self weight of beam. Design a beam section considering M20 concrete and Fe415 grade steel. Assume other data suitably. 8

2(a) The shear force diagram for a simply supported reinforced concrete beam of cross section 300×600mm is as shown in Fig. 2(a). The beam is reinforced with 4-20 mm bars in tension and effective cover of 50 mm. Design shear reinforcement for section X-X as shown in figure. Consider concrete grade of M20 and Fe415 steel. 6

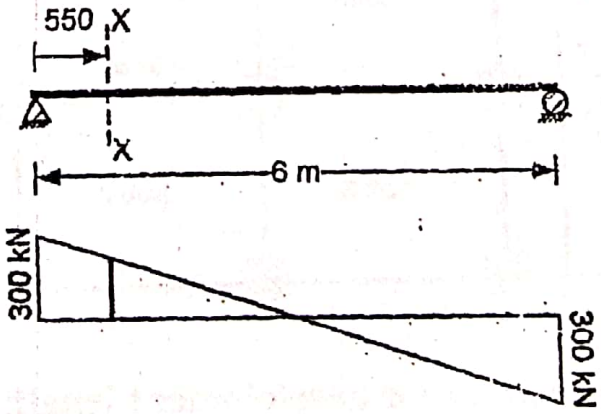


Fig. 2(a)

Contd. ...

(b) A simply supported reinforced concrete beam is constructed of 20 Mpa and Fe415 steel. It supports factored dead load of 5 kN/m and factored Live load of 35 kN/m. Bending Moment diagram, shear force diagram and the cross section at maximum bending moment are shown in Fig. 2(b). If two 20mm diameter bars are to be curtailed, find the actual point of curtailment, check development length and shear capacity at point of cut off. Also draw a neat sketch of reinforcement detailing. 4+4+4+2

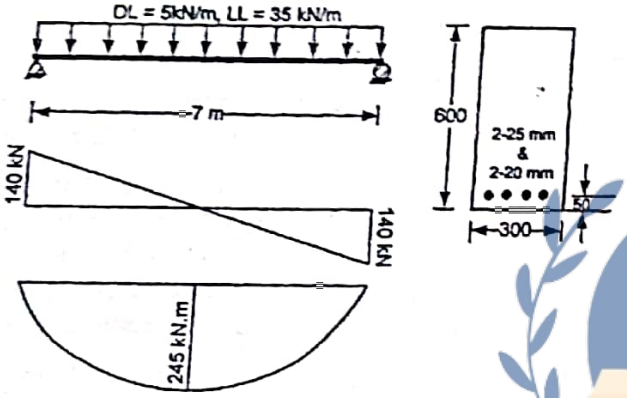


Fig. 2(b)

3(a) Design Slab B for the floor grid of a building as shown in Fig. 3(a). It is subjected to superimposed load of 4 kN/m², and surface finish of 1.2 kN/m². Refer IS Code for Bending moment coefficients. Sketch complete reinforcement detailing. 12+4

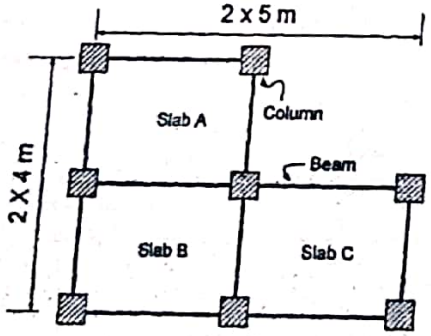


Fig. 3(a)

(b) Derive the relation for develolpment length as per provision made in IS456: 2000. 4

Contd. ...

4(a) A reinforced concrete column of 300mm diameter unsupported length of 3.2 m and effective length of 3.0 m. Design the column to support a factored axial load of 400 kN along with factored moments of 60 kNm and 40 kNm at the top and bottom respectively. Use M20 grade concrete mix and Fe500 grade HYSD steel bars. Design shear reinforcement with helical reinforcement. Sketch a neat diagram of reinforcement detailing (cross-section as well as longitudinal section). 7+3

(b) A concrete beam of width 200 mm and overall depth of 400 mm is prestressed by a parabolic cable with an eccentricity of 15 mm at the centre and zero at the supports with an effective force of 100 kN. The live load on the beam is 2 kN/m. Draw stress distribution diagram at the central section from the following two methods:
(i) Homogeneous beam concept (stress concept)
(ii) Load Balancing concept 4+4

5(a) An Isolated RC footing has to transfer a dead load of 900 kN and imposed load of 500 kN at service state from a circular column of diameter 500 mm with 6-22 diameter longitudinal bars. Design footing considering f_{ck}= 20 MPa, f_y=500 MPa, safe bearing capacity= 200 kN/m². Draw a neat diagram of reinforcement detailing.

(b)(i) Differentiate between pre-tensioning method and post-tensioning method.

(ii) A prestressed concrete beam of rectangular cross-section 150mm wide and 320mm deep is presressed by 6 wires of 6mm diameter, provided at eccentricity of 60mm. The initial stress in the wire is 1150 N/mm². Find the loss of stress due to creep of concrete. Take E_s=2×10⁵ N/mm², E_c=3×10⁴ N/mm² and creep coefficient of concrete as 1.5.

PURBANCHAL UNIVERSITY
2015

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG451CI: Design of RCC Structure *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. IS 456 : 2000 and IS 1343 : 2012 are allowed to use.

Answer FOUR questions.

1. Design a slab for a room having 5m×6m effective span, if super imposed load and floor finish are 3 KN/m² and 1.5 KN/m² respectively. Adopt M20 grade concrete and Fe415 steel. Slab has one long edge discontinuous. Also sketch the plan of reinforcement detailing. 15+5

2(a) Design RCC Beam of overall dimension 300mm×600mm for factored moment of 100KN-m Use M20 grade concrete and Fe415 steel. 10

(b) Find the stirrups required for resistance against shear failure if the factored shear force at the section is 250 kN. Take the beam width as 300 mm and effective depth as 600 mm with tension reinforcement 4-20 mm bars. Assume M20 concrete and Fe415. 10

3(a) Explain the design steps for doglegged staircase. 8

(b) Design a square column to carry a service load of 1500 KN. The size of section is 500mm×500mm and effective length of column is 3m. Design and draw ties also. Use M20 concrete & Fe415 steel. 12

4(a) Design a footing for a square column 500mmx500mm carrying an axial load of 900 kN. The allowable bearing capacity of soil is 150 KN/m² with 1.5 in depth of foundation. Use M20 concrete & Fe415 steel. 12

Contd. ...

(b) A prestressed concrete beam of 6m effective span with 300mm width×500mm overall depth. Straight tendon with pre-stress force of 400 KN is applied at height of 150mm above soffit (bottom face of beam). The beam has UDL of 20KN/m including self weight. Determine extreme stress in concrete in mid-span of section. 8

4×5=20

5. Write short notes on any FOUR:

(a) RCC design philosophy

(b) Under-reinforced and Over-reinforced beam

(c) Modular ratio

(d) Effective length of beam

(e) Thrust Line

PURBANCHAL UNIVERSITY

2014

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG456CI: Design of RCC Structures

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Adopt suitably any missing data. Use of IS 456, IS 1314 and IS 456SP-16 are allowed.

Answer FOUR questions.

1(a) State different assumptions made in working stress design of RCC structures Show stress and strain diagram for this method with neat sketches. 10

(b) A beam 250mm × 550mm (effective) is subjected to a factored BM of 300 kN-m. Determine the area of steel required. Use M20 concrete and Fe250 steel. Adopt d=50 mm. 10

2(a) A simply supported beam of effective span 5.0 m carries a UDL of 100 kN/m over its span. The beam is 300 mm × 600 mm (effective) in section and reinforced with 5-25 mm diameter bars. Out of these bars, 2 bars are bent-up safely near the supports. Design the shear reinforcement for the beam. Use M20 concrete and Fe415 steel. 10

(b) Design a short column under biaxial bending with the following data,

Size of column = 45 cm × 45 cm,

Factored load = 1000 kN,

Factored moment M_{ux} = 75 kN-m,

Factored moment M_{uy} = 60 kN-m.

Moments due to minimum eccentricity are less than the values given above. Use M15 concrete and Fe415 steel. 10

3(a) Design a corner slab of a framed building 4m × 5m in dimensions (clear). A slab has to carry a live load of 3 kN/m² and a floor finish of 1 kN/m². Use M20 concrete and Fe 415 steel. 14

Contd. ...

(b) Draw neat sketch of a dog legged staircase with necessary reinforcement details. 6

4(a) Design a square footing of uniform thickness to carry a column load of 1000 kN from a 40 cm square column. The safe bearing capacity of soil is 100 kN/m². Use M20 concrete and Fe 415 steel. 10

(b) A concrete beam 150 mm × 300 mm is pre-tensioned by 7 wires of 7 mm diameter at an initial stress of 1000 N/mm² with their centroid located at an eccentricity of 5cm below the mid section of the beam. Find loss of prestress due to elastic shortening of concrete, creep and shrinkage of concrete. Use M40 concrete. The creep coefficient =1.6 10

5. Write short notes on any FOUR: 4×5=20

(a) Flanged beam

(b) Characteristics of one way slab versus two way slab

(c) One way and two way shear criteria in footing design

(d) Design steps of RCC staircase

(d) Concept of pre-stressing

(e) Pre-tensioning and post tensioning method

PURBANCHAL UNIVERSITY
2018

B.E. (Civil)/Seventh Semester/*Final*
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG450CI: Estimation and Valuation *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1. Explain about Estimated cost and Actual cost? What are the purposes of estimate? 2+3

2. How do you prepare an Abstract of Cost (AoC)? Explain about overheads and Contingency? 2+3

3. Explain detailed specification of First Class Brick work in superstructure and (1:2:4) concrete works in RCC Slab. 3+3

4(a) What is revised estimate? Describe its uses. 3

(b) Prepare an Approximate Estimate of 3 storied RCC framed structure having 250m² carpet area of each floor. 45% of built up area is covered by verandah, corridor etc. and 6% of built up area is covered by wall. The plinth area rate of building is Rs. 3200/- per m2 excluding building services. Assume necessary data, if required. 5

5(a) Calculate the quantities of the following item of work for a slab culvert of 2.4m clear span and 5.0m road way from the accompanying drawing: 2+5+4+5

(a) Earth work in excavation
(b) First class brickwork in cement mortar (1:6)
(c) R.C.C. slab.
(d) Reinforcement bar

(b) Estimate the quantity of Earthwork of Road Constructed in hill area with following details: 12
Formation width in cutting 8m and in banking 10m.
Side slope in cutting 1.5:1 and in banking 2:1

Contd. ...

Chainage	Depth		Transverse slope
	Cutting	Banking	
0	20cm		10:1
30	25cm		11:1
60	35cm		12:1
90		45cm	13:1
120		60cm	14:1

Assume necessary data.

6(a) Define rate analysis and its requirement? 3

(b) Calculate the quantities of materials required for following items of work: 3×3=9

(i) Plaster work of 10m height, 5m length with (1:4) cement mortar

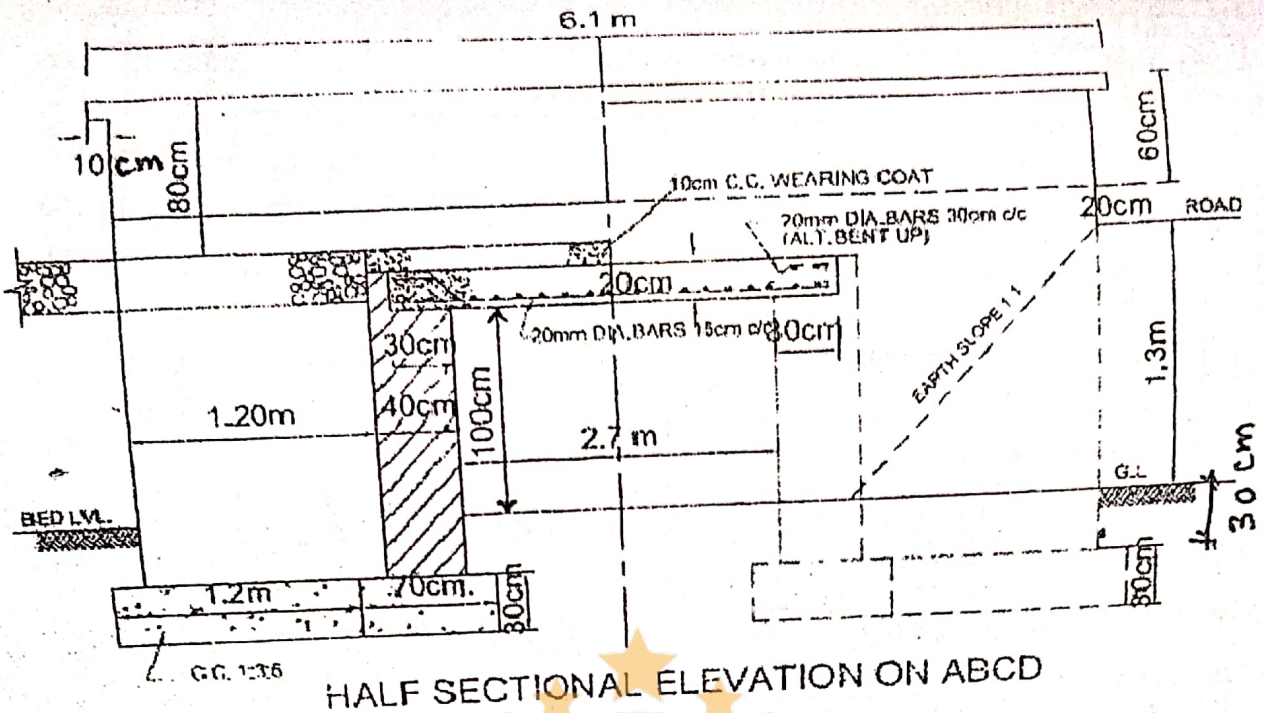
(ii) 100mm thick PCC work (M20) in foundation of size 4m×5m

(iii) RCC work (1:1.5:3) in 5 no. column (0.3m×0.3m×3.25m)

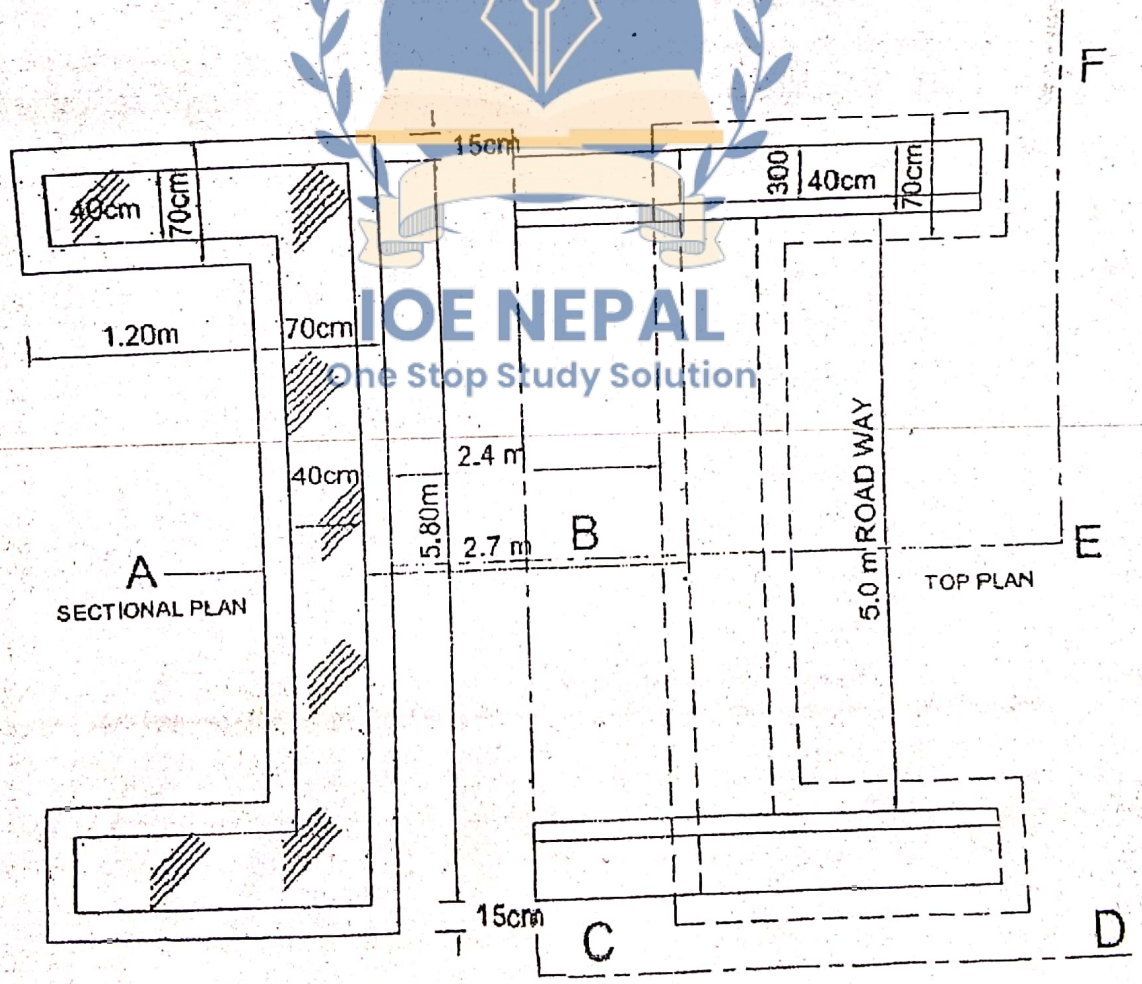
(c) Prepare Rate Analysis of Brick work per m^3 on superstructure. Assume suitable rates for materials and labour. Given, no of skill labour per $10m^3$=15, no. of unskill labour per m^3=2.2, No. of labour for scaffolding per $10m^3$= 0.7. 6

7(a) Explain methods of determining depreciation. 4

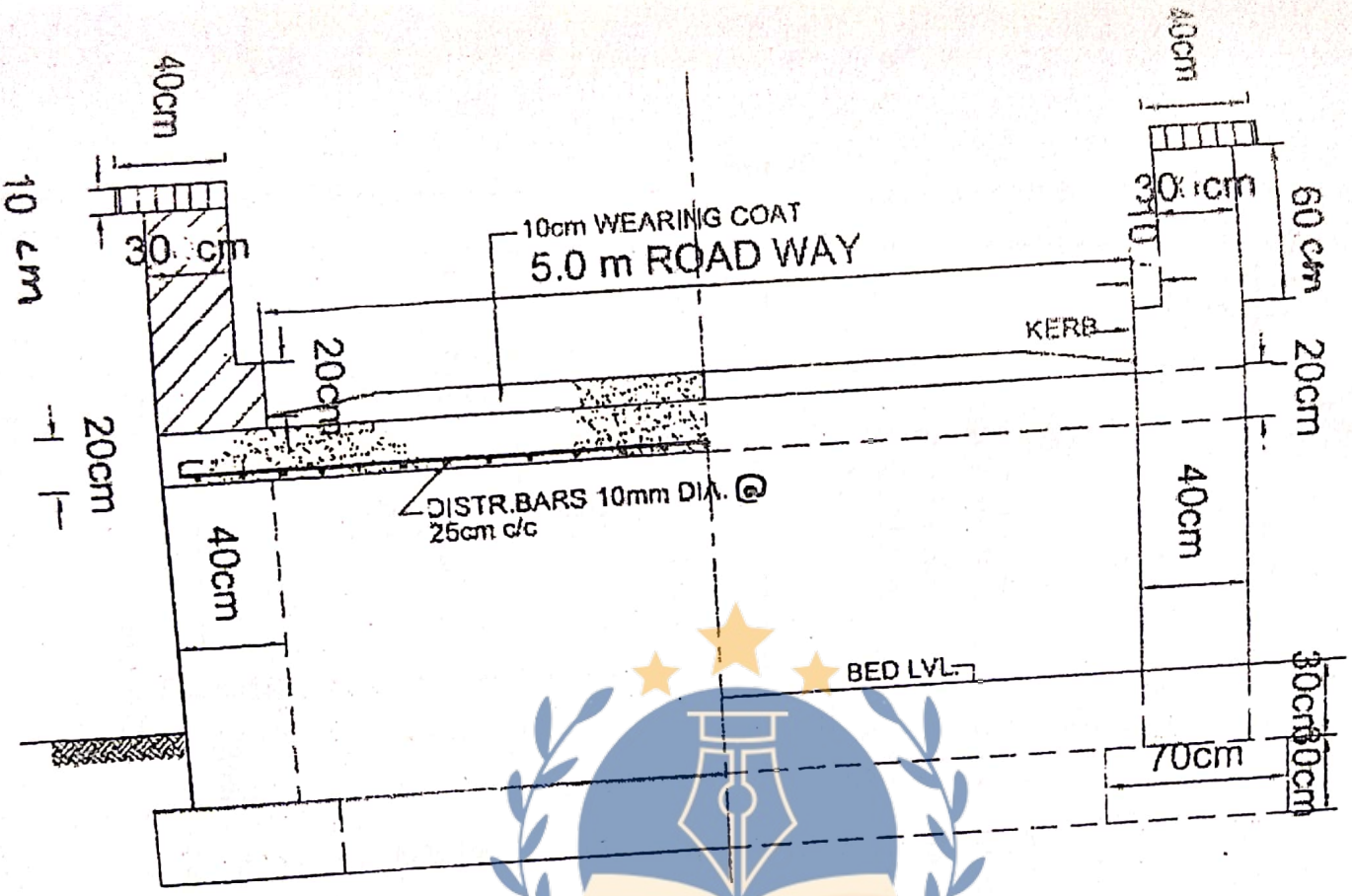
(b) The RCC framed structure is sold at a cost of Rs. 1.8 crore including the cost of land. Calculate the amount of sinking fund at 5% interest assuming the life of building as 40 years and scrap value of the building as 12% of cost of selling. 6



HALF SECTIONAL ELEVATION ON ABCD



HALF SECTIONAL PLAN



HALF LONGITUDINAL SECTION
ON CBEF

CN :- 7317655

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Final* ~~37~~

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG450CI: Estimation and Valuation *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1(a) Define estimating. What are the general principles for the measurement unit of different item of works? 4

(b) Write Key Note for method of measurement of following item of works: 6

(i) Brickwork (ii) Plastering work (iii) Painting work

(c) Prepare a format of BOQ and AOC. 1.5+1.5

2(a) What are the points should be important for specification. 5

(b) Calculate the quantities of materials for B/W 1:4 c/s morter for $10m^3$. 5

(c) Prepare an analysis of rate for 12.5mm thick plastering work in 1:4c/m in ceiling. 5

(d) Calculate the quantities of materials for M20 PCC for RCC work up to ground level as shown in figure 1. 5

3(a) Calculate the quantities of earthwork for a portion of road from the following data: 10

Formation width of road = 8m.

Side slope in cutting and filling (S:1)=1:1 and 2:1

Chainage (m)	Depth of cutting at center (m)	Transverse slope from center	
		Left Side	Right Side
0+000	0.50	6:1 Dn	10:1 up
0+100	0.60	8:1 Dn	12:1 up

Contd. ...

(b) When and where the Annual repair and maintenance estimate and Revised estimate are used. Prepare the approximate cost of building and plinth area rate of building when building has plinth area 555 sqm. Area occupied by corridors, verandah.etc is 20% of plinth area and area covered by wall is 12% of plinth area. Carpet area rate is Rs 9500/sqm including water supply, sanitation, electrification and other services. 3+4

4. Calculate the quantities of following items of work from the attached drawing (Fig. 2): 4×5=20

(a) E/W in excavation for Foundation.

(b) I-Class B/W in 1:4 cement mortar.

(c) Steel bars including bending in RCC works.

(d) Pointing 1:3 c/m on exposed surface of B/W.

5(a) What are the purpose of valuation? Derive the expression for the Yearly installment of the sinking fund. 3+3

(b) An owner has decided to sell his vacant property of 30 years old single storied building having a total plinth area of 110m². The cost of land is Rs. 300000.00. Compared with adjoining areas; the present plinth area rate of same building is Rs. 5500.00 per m². What should be the sale price of the property having total life of 80 years and annual sinking fund interest is 5%. 5

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG450CI: Estimation and Valuation *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1(a) Define estimate. List out the data required for preparing an estimate and discuss with relevant examples how estimate is based on each of them. 5

(b) Calculate the quantities of materials required for 10m³ brick masonry in 1:3 cement sand mortar. (Brick size= 230*110*55 mm; Mortar thickness= 12 mm). 5

2(a) What is overhead cost? Why and how is overhead cost considered during estimation? Prepare a format of BOQ and AOC. 3+2

(b) Prepare an analysis of rate for PCC (1:3:6) in foundation per m³ based on given data. Allow 15% contractor's overhead and profit. 6

Manpower required: 1 skilled and 4 unskilled per m³ of finished PCC.

Market Rates: Cement- NRs. 16,000/- per MT, Sand- NRs. 3,000/- per m³, Aggregate- NRs. 3,200/- per m³.

Wages: Skilled- NRs. 700/- per man-day, Unskilled- NRs. 450/- per man-day.

3(a) Define standard specification with examples. Elaborate the purpose of specification. 3+3

(b) Workout a preliminary estimate a conference hall designed for Purbanchal University with a capacity of accommodating 600 students having carpet area requirement of 1.5 m²/student. The floor height of the hall is designed to be 3 m. It is found that front platform and circulation area in the hall is about 30% of plinth area and wall area accounts 8% of the plinth area.

Adopt following details for the estimation:

(i) Plinth area rate for civil works= NRs. 18,000/- per square meter (m²) of the hall.

Contd

(ii) Extra cost for Architectural treatment= 2.5% of civil works cost.

(iii) Extra cost for water supply and sanitation= 7.5% of civil works cost.

(iv) Extra cost for electric installations= 5% of civil works cost.

(v) Extra cost for acoustic treatment and sound systems= 5% of civil works cost.

In addition, it is found that similar structure constructed recently required 5% of overall costing for consulting and supervision services. Also, provide a provision of 5% contingency in the estimate. 5

Estimate the quantity of earthwork for a portion of road based on following information. 10

Formation width of road= 10m

Side slope in banking and cutting= 2:1 and 1:1 respectively

Downward grade of 1 in 120 from chainage 7+070 to 7+100, while it remains in level from chainage 7+100 to 7+160 and again an upward grade of 1 in 90 from chainage 7+160 to 7+190.

Assume the formation level at 7+070 m is 1197.50 m

The levels are as below:

Chainage:	7+070	7+100	7+130	7+160	7+190
RL of Ground (m):	1204.35	1201.85	1196.25	1195.30	1196.75

Find out the quantities of following items for the building, whose working drawings are attached herewith. 18

Also, clearly state/illustrate any assumptions made during the computation and centerline lengths under remarks column.

(a) Earthwork in excavation of foundation and its backfill. 3+1

(b) 1:2:4 cement concrete in RCC for pad footing. 3

(c) Brickwork in 1:4 C/S mortar in superstructure. 4

(d) Sal wood for frames of doors and windows. 3

6(a) Mr. A approached Nepal Bank Ltd. for a business loan aga mortgage of a RCC building built 15 years ago on his freel land located at Central Business District (CBD) of Biratn town. Suppose, the bank hired you for valuation of the prope What distress value do you recommend for advancing the l against the mortgage, if the findings of your survey are as follow?

(i) Area of Land= 500 m²

(ii) Rent fetched by the property= NRs. 1,40,000/- per mont

(iii) Expense on insurance premium= NRs. 9,000/- per annu

(iv) Municipal rental tax= 10% of gross rent

(v) Land ownership tax= 2.5% of land value per annum (bas on govt. rate)

(vi) Repair and maintenance cost= 5% of gross rent

(vii) Expense on management and security services= 10% gross rent

(viii) Prevailing government rate of land = NRs. 2,000/- per m²

(ix) Prevailing market rate of land= NRs. 6,000/- per m²

You are required to follow the valuation guidelines of Nepal Ba Ltd as below.

(i) Total life of RCC building= 75 years

(ii) Weightage to government rate for land valuation= 0.25

(iii) Weightage to market rate for land valuation= 0.75

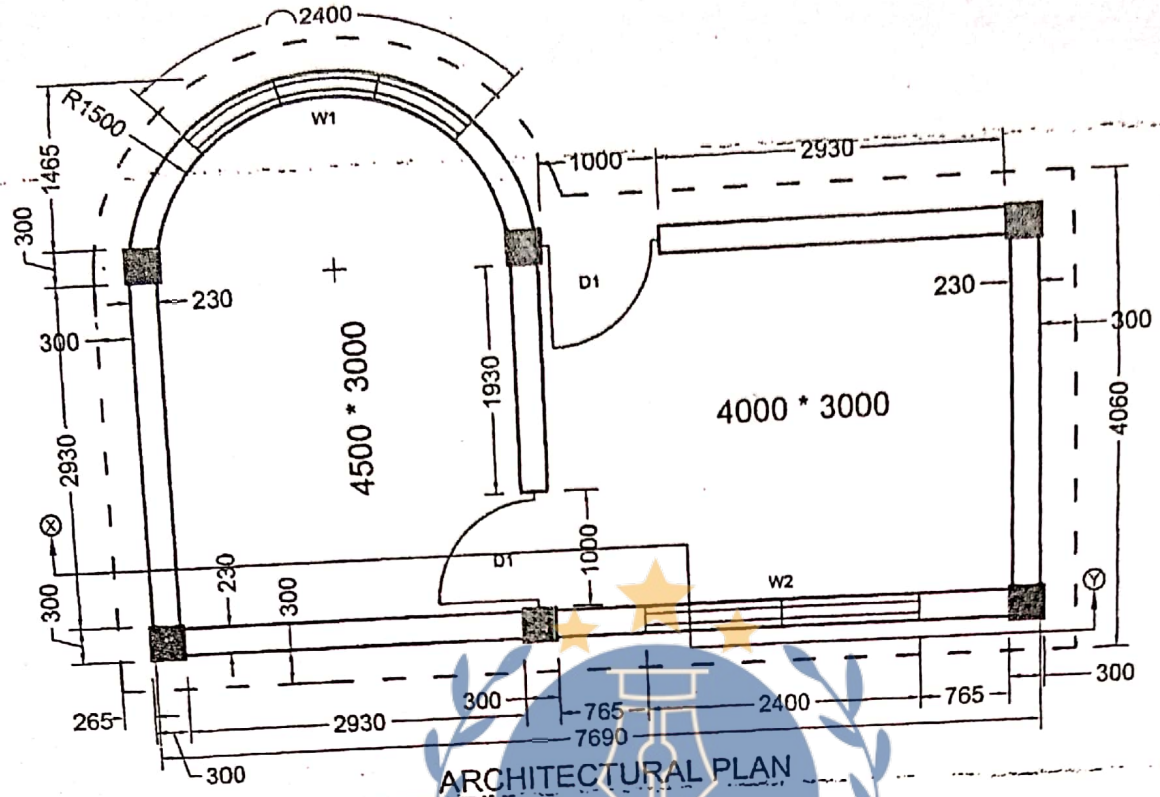
(iv) Distress value of property= 60% of fair market proper value.

Adopt an interest rate of 10% and capital redemption rate of 5%.

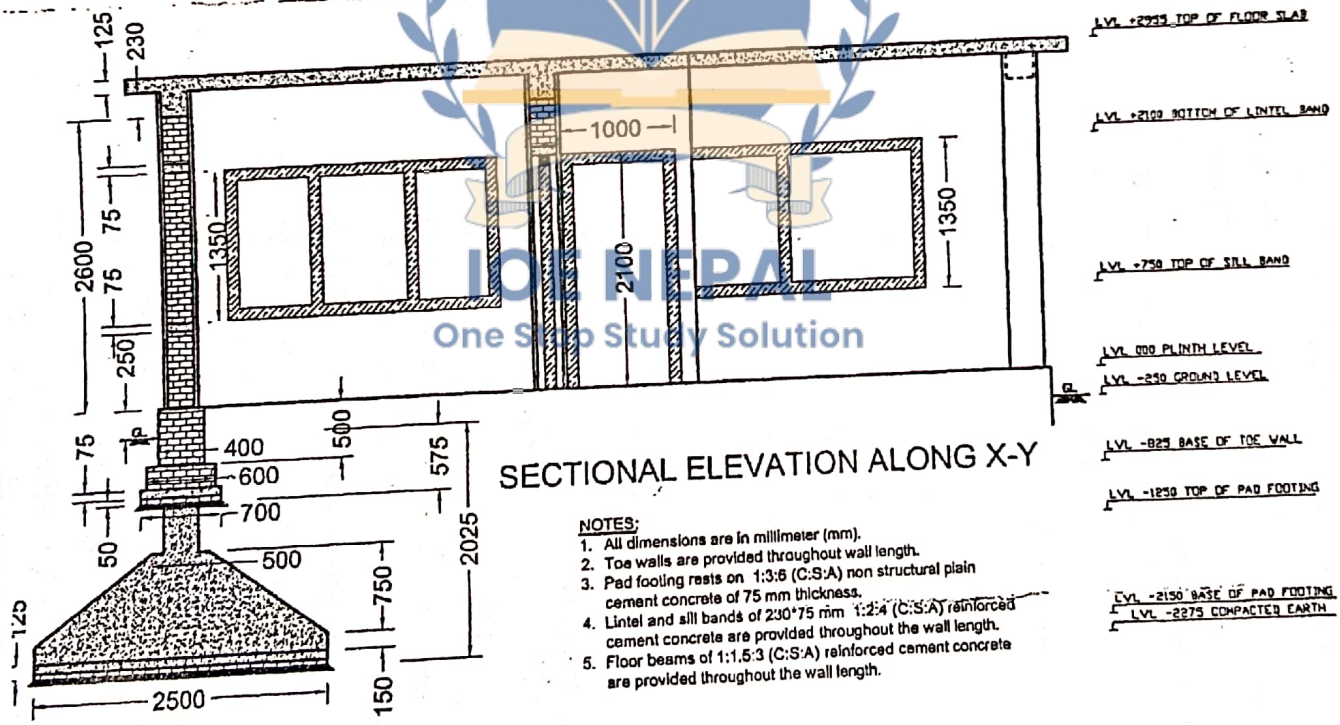
(b) Define rate analysis. List out the factors affecting the ra analysis and discuss in brief.

7(a) List out the various types of estimate. Describe when revise estimate and supplementary estimate is prepared. 1+

(b) Elaborate sinking fund and scrap value shortly.



ARCHITECTURAL PLAN



SECTIONAL ELEVATION ALONG X-Y

NOTES:

1. All dimensions are in millimeter (mm).
2. Toe walls are provided throughout wall length.
3. Pad footing rests on 1:3:6 (C:S:A) non structural plain cement concrete of 75 mm thickness.
4. Lintel and sill bands of 230*75 mm 1:2:4 (C:S:A) reinforced cement concrete are provided throughout the wall length.
5. Floor beams of 1:1.5:3 (C:S:A) reinforced cement concrete are provided throughout the wall length.

PURBANCHAL UNIVERSITY

2016

B.E. (Civil)/Seventh Semester/ *Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG450CI: Estimation and Valuation *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1(a) What are the essential date of estimate? Describe each in brief? 5

(b) What are the various methods of calculating quantities? Prepare a tabular format of AOC, BOQ and quantity measurement sheet. 3+2

2(a) What are the points to be considered for preparation of specification. Describe about specification and its types. 5

(b) When and where following estimates are used? 5

(i) Annual repair estimate (ii) Revised estimate

(iii) Supplementary estimate (iv)Complete estimate

(v) Preliminary estimate

3(a) What are the documents required for the preparation of a detailed estimate? Describe in brief. 5

(b) Prepare a preliminary estimate of school building for 850 students in order to assess the amount of fund based on the following particulars: 5

(i) Carpet area required per students = 1.35 square meter

(ii) Area of corridor, verandah and lavatories etc. = 25% of the plinth area.

(iii) Area of walls = 18% of plinth area.

(iv) Consider plinth area rate = NRs. 35000.00 per sq. m.

(v) Cost of water supply= 5% of the building cost.

(vi) Cost of sanitation = 7% of the bldg. cost.

(vii) Cost of electrification = 12%ofthe bldg. cost.

Contd. ...

(viii) Cost of approach road and boundary wall 3% of the bldg. cost.

(ix) Contingency and work charged establishment shall be 5% and 2.5% of the total cost respectively

4(a) A 125mm thick RCC slab (1:1.5:3) is to be provided over a room 4m×7m inner dimension (provide suitable bearing). Calculate the material required for the completion of the work. 5

(b) Prepare a rate analysis as per GON format for first class brick work in cement sand mortar (1:6) over cement concrete up to DPC level 5

5. Estimate the quantity of earthwork of a portion of hill road from the following data: 10

Formation width = 8.0m

Side slope in banking is 1.5:1 (H:V) and for cutting (1:1) (H:V)

Chainage	Depth of filling	Transverse slope	
		Left Side	Right Side
0+00	0.4	6:1dn	10:1up
0+50	0.6	8:1dn	8:1up

6. *Estimate the quantities of following item of work for building from given drawing.* 20

(i) Earth work in excavation

(ii) 1st class brickwork in foundation up to plinth

(iii) 1st class brickwork in super structure

(iv) 12.5mm thick cement plaster (1:4 c/s) inside

7(a) A Govt. accommodation is built at the cost of NRs. 6, 00,000/-. The water supply, sanitary and electrical installation expenditure is NRs. 1, 50,000/-. Calculate the standard rent of the building if the following rate of return are fixed: 5

Contd. ...

(i) 6% on construction cost

(ii) 1.5% towards maintenance of building work

(iii) 4.5% on installation expenditure

(iv) 4% on maintenance of installation

(v) NRs. 1 200/- as property tax per year

(vi) Cost of land is to be neglected

(b) Distinguish clearly between

(i) Depreciation and sinking fund

(ii) Scrape value and salvage value

Description	NO	length (m)	Breadth (m)	height (m)	Unit	Quantity	Remarks
E/W excavation for foundation							
long wall	2	6.10	0.90	1.00	m3	10.98	
short wall	3	4.30	0.90	1.00	m3	11.61	
					total	22.59	
CC (1:4)							
foundation							
long wall							
1st step	2	6.10	0.60	0.15	m3	1.098	
2nd step	2	6.10	0.50	0.15	m3	0.915	
3rd step	2	6.10	0.40	0.30	m3	1.464	
short wall							
1st step	3	4.30	0.60	0.15	m3	1.161	
2nd step	3	4.30	0.50	0.15	m3	0.968	
3rd step	3	4.30	0.40	0.30	m3	1.548	
to plind							
long wall	2	6.10	0.40	0.41	m3	2.0008	
short wall	3	4.30	0.40	0.41	m3	2.1156	0.45-0.04
					total	11.2704	
Work frame							
door	1	5.10	0.10	0.075	m3	0.03825	L=0.9+2.1+2.1
window	2	6.60	0.10	0.075	m3	0.099	L=3×1.2+2×1.5
					Total	0.13725	
C. in foundation							
long wall	2	6.10	0.9	0.40	m3	4.392	
short wall	3	4.30	0.9	0.40	m3	4.644	
						9.036	

ABSTRACT of cost

Description	Quantity	Rate	Amount	Unit	Remarks
E/W excavation	22.59	300.00	6777.00	m3	
Brick work (1:4)	11.2704	15000.00	169056.00	m3	
Wood work	0.1373	200000.00	27480.00	m3	
PCC (1:3:6)	9.036	11000.00	99396.00	m3	

Sub total ⇒ 302689.00

Contigency 5% of subtotal ⇒ 15134.45

Vat 13 % ⇒ 39349.57

Total ⇒ 357172.02

PURBANCHAL UNIVERSITY

2016

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG450CI: Estimation and Valuation *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1(a) Define estimating. What are the essential data for estimating? 5

(b) Write units of measurement and payment for following item of works: (i) P.C.C. for R.C.C. (ii) 10mm thick PCC (iii) 12mmØ GI pipe (iv) CGI sheet (v) cornice (vi) Canal lining (vii) Plastering (viii) Soling (ix) painting works (x) skirting (10 cm high).

2(a) Explain about contingencies and workcharged establishment. 5

(b) Calculate the quantities of materials required for 50m³ RCC work in (1:1.5:3). 5

(c) Prepare an analysis of rate for 12.5mm thick plastering work (1:4) in ceiling. 5

(d) Prepare a tabular format for: 5

Quantity measurement sheet, AOC and BOQ

3(a) Calculate the quantities of earthwork for a portion of road from the following data: 10

Formation width of road=10m

Side slope in cutting and filling(S:1)=1 ½:1 and 2:1 respectively.

Chainage (m)	0	50	100	150	200	250
RL of GL (m)	101.75	103.3	104.67 102.25	103	104	102

Formation level at 0m chainage=101m

Rising gradient of 1 in 100 from 0 to 150m chainage and falling gradient of 1 in 100 from 150 to 250m chainage.

Contd. ...

(b) When and where the annual repair and maintenance estimate and revised estimate are used. Prepare the approximate cost of Star Engineering College building having carpet area of 4000m². The area of corridor, staircase and verandah can be taken as 20% of plinth area and 10% of plinth area is taken by walls. Prevailing plinth area rate is Rs. 7000/m² 5+5

4 Calculate the quantities of following item of work from the attached building drawing (Fig. 4): 20

(i) Earthwork in excavation of foundation

(ii) Brickwork in 1:4 cement sand mortar in foundation and plinth.

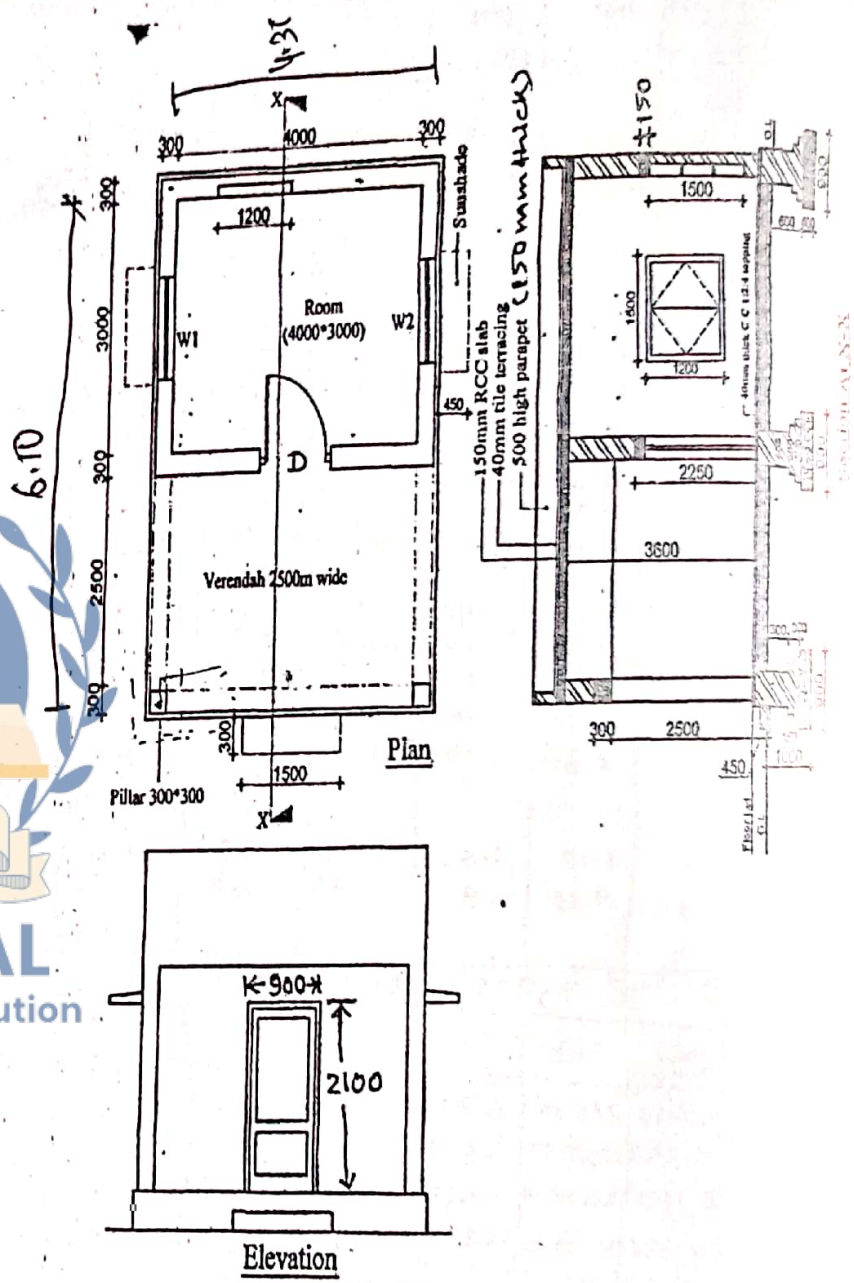
(iii) Wood work in door and windows frame.

(iv) PCC in foundation

(v) Prepare an abstract of cost (AOC) for the above works.

5(a) What is the purpose of valuation? Describe the various methods of valuation used. 5

(b) A building in an A class city is let out @Rs. 5000 per annum. The total outgoing of property is estimated to be 15% of the gross income, calculate the capitalized value of the property if the present rate of interest is 7.5% and life of the property is 75 years. 5



All dimensions are in mm, if otherwise mentioned in the drawing

Fig. 4

PURBANCHAL UNIVERSITY
2015

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG450CI: Estimation and Valuation *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer ALL questions.

1. Define estimation and its requirements? Write down the principles of units for various items of works with payment mode. 3+2

2. Explain various method of calculating quintiles? Define Contingencies. 3+2

3. Write down the detailed specification of RCC work. 6

4(a) List out the various type of Estimation? Explain detailed estimate. 3

(b) Prepare a preliminary estimate of five storey building having a carpet area of one floor is 190 m^2 and floor height 2.8m each. The area required for circulation and wall equal to 34.5% of total built up area. 5

(i) The cubic rate of building for civil works is Rs 10000/m^3.

(ii) Extra for water supply and sanitation installations - 12% of building cost.

(iii) Extra for electric installations - 5% of building cost.

(iv) Extra for other services - 5% of building cost.

(v) Contingencies - 2.5%.

(vi) Supervision charges - 8%.

5(a) Estimate the quantities of following items with the given detail drawing fig below. 2+5+3+4+2

(i) Earthwork in excavation of foundation

(ii) First class brickwork in 1:4 cement sand mortar

Contd. ...

(iii) Wood work for frames of doors and windows (frame size 100*100mm)

(iv) Form work of RCC structure above plinth level (PL)

(v) Skirting

(b) Estimate the quantity of earthwork and side slope of a portion of hill road from the following given data. 12

(i) Formation width (B) in cutting=6m and in banking= 8m

(ii) Side slope for banking (s)=2:1 and for cutting (p)=1.5:1

Chainage(m)	RL of ground (m)	RL of formation level	Transverse Slope (r)
0	1298	1300	11:1
50	1303	1:150 downward	12:1
100	1300	1:150 downward	14:1
150	1301	1:150 downward	12:1
200	1305	1:100 upward	14:1

6(a) Define rate analysis and its requirement? List the factors affecting the rate analysis. 3+3

(b) Calculate the Quantity require for following items of work. 6

(i) 25m³ brickwork in cement mortar (1:5), brick size (230*110*55) mm.

(ii) 150 m² Cement, sand and lime plaster of 12 mm thick (1:2:4).

(c) Prepare Rate Analysis of 100m³ M20 grade concrete for RCC work. Assume suitable rates for materials and labour. 6

Given, no of skill labour per m³ = 0.8

No of unskilllabour per m³ = 7

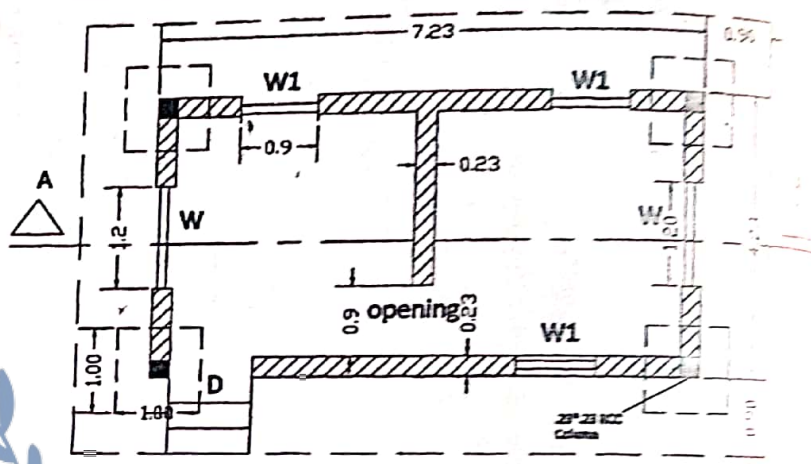
7(a) Define valuation and purpose of valuation. 2+2

(b) An old building has been purchased by a person at a cost of Rs. 200000 excluding the cost of land. Calculate the amount of sinking fund at 5% interest assuming the life of building as 25 years and scrap value of the building as 10% of cost of purchase. 6

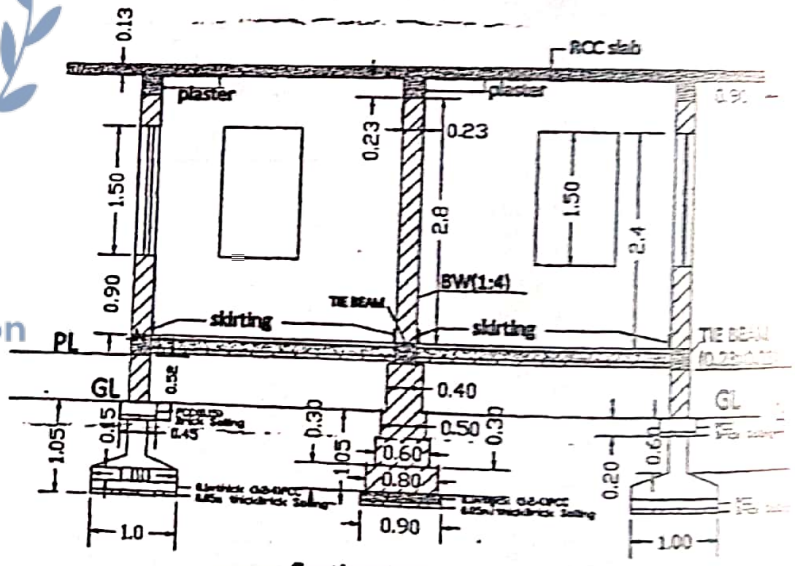
376

Contd. ...

Fig. of Question No. 5(a)



GROUND FLOOR PLAN



Section At A-A

PURBANCHAL UNIVERSITY
2013

B.E. (Civil)/Sixth Semester/Final
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG365CI: Estimation & Valuation

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer ALL questions. Assume necessary data if necessary.

1(a) What are the essential data for estimating? Describe each in brief. 5

(b) Give the justification for the preparation of preliminary estimate 5

2(a) What are the units of measurement and payment of following items. 5
[i] Thin partition wall
[ii] Rigid of roofing
[iii] Pointing on wall
[iv] Cornice
[v] Rock excavation

(b) Prepare a preliminary estimate of a double storied office building having carpet area of 1800 m^2. It may be assumed that 30% of the built up area will be taken by corridors, verandah, staircase etc and 10% of the area to be occupied by walls. The plinth area rate is Rs. 7000.00 per m^2 including water supply, sanitation, electrification and other charges. 5

3(a) Calculate the quantities of materials required for 11m^3 of Brick masonry in (1:3) cement mortar. 5

(b) Prepare an analysis of rate for 12 mm thick plastering in (1:3) cement mortar on wall. 5

4(a) How are following items of work measured: 5
(i) Painting in doors and windows
(ii) Plastering

Contd. ...

(b) When and where the following estimates are used? 5

(i) Annual repair and maintenance estimate

(ii) Revised estimate

5. Find out the quantity of earth work from the following data: 10

Dist (m)	300	400	500	600	700	800	900
GRL (m)	115.2	116.1	116.8	118.0	118.2	118.1	117.8
FRL	116.5	Upward Gradient 1 in 200			Downward Gradient 1 in 400		

Formation width of road is 10 meter

Side slope 2:1 in banking and 1.5:1 in cutting

6. Find out the quantities of the following items from attached building drawing. (Assume suitable data if needed and show in remarks): 4+2+6+3=15

[i] Earthwork in excavation

[ii] 4.0 cm thick D.P.C. (1:2:4)

[iii] Brickwork in foundation and superstructure with cement sand mortar (1:4)

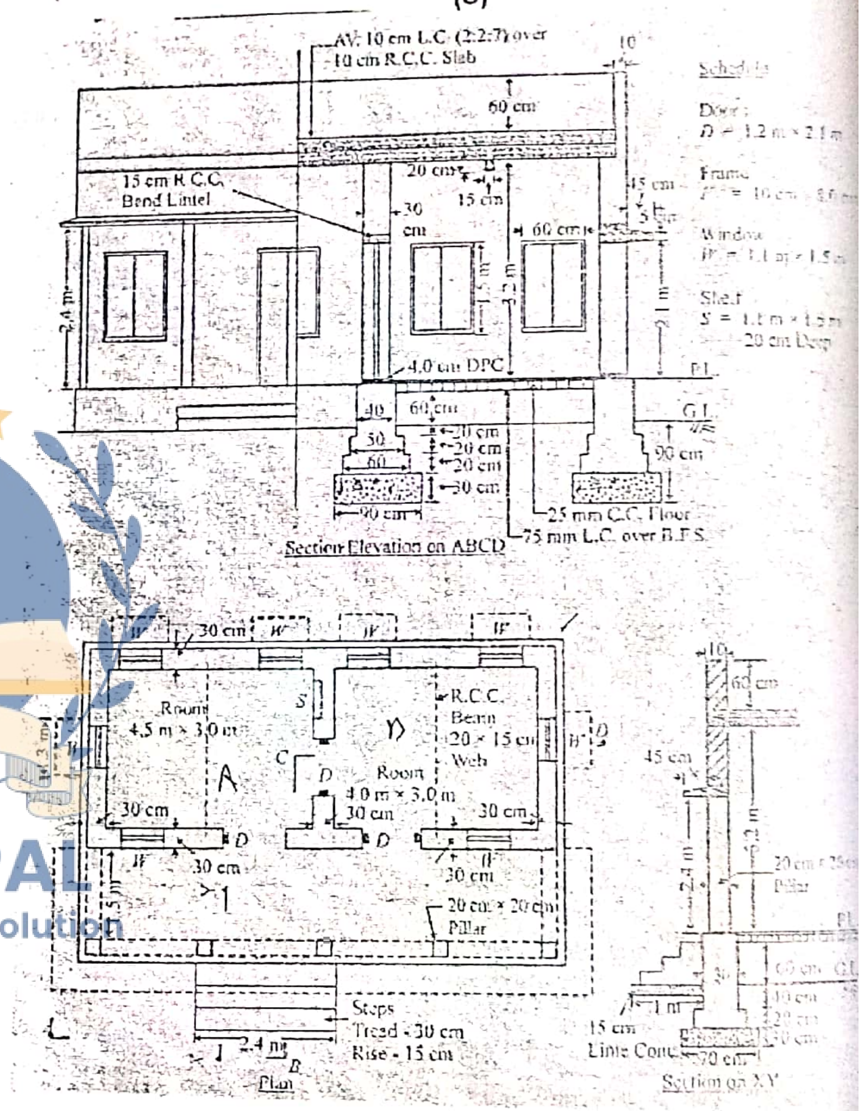
[iv] Wood works for frame of doors and windows

7(a) Distinguish clearly between: 5

[i] Sinking fund and depreciation

[ii] Salvage value and scrap value

(b) A building in an A class city is let out @ Rs. 5000.00 per annum. The total outgoings of the property is estimated to be 15% of the gross income, calculate the capitalized value of the property if the present rate of interest is 8% and life of the property is 50 years. 10



B.E. (Civil)/Sixth Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG365CI: Estimation & Valuation

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer ALL questions. Assume necessary data if necessary.

1(a) Write down the various purposes of Estimate? 5

(b) Explain the rules of measurement of painting works on corrugated and uneven surfaces? 5

2(a) What are the various methods of calculating quantities? Explain briefly with examples. 5

(b) What do you mean by overhead cost and contingencies? Describe briefly. 5

3(a) List out the different types of estimate? When and where revised estimate, supplementary estimate, extension and improvement estimate are used? 5

(b) Prepare a preliminary estimate of a four storeyed office building having a total carpet area of 1850 m^2. It may be assumed that 25% of the built up area will be taken up by corridors, verandah, lavatories, staircases etc. and 10% of the built up area will be occupied by the walls. 5

- Plinth area rate: Rs. 9500 per m^2
- Extra due to deep foundation: 1% of building cost
- Extra for special architectural treatment: 0.5% of building cost
- Extra for w/s and sanitary installation: 8% of building cost
- Extra for internal electrification: 12% of building cost
- Extra for other services: 3% of building cost
- Contingencies: 2.5% of building cost
- Supervision charges: 8%

Pg. 467

Contd. ...

4(a) Prepare a rate analysis for 15 mm thick cement plastering works in 1:4 cement mortar per sq.m as per our Nepalese practice and format? Assume water cement ratio as 0.5. 5

(b) Calculate the quantities of materials required for 12 cu.m of 1st class chimney made brick work in 1:5 cement mortar upto plinth level. Assume brick size as 240×110×65mm. and water cement ration as 0.45. 5

5. Estimate the quantities of earthwork for a portion of a road from the following data: 10

Road width at the formation surface is 8 meters.
Side slopes 2:1 in banking and 1½:1 in cutting.
Length of chain is 30 meters

Chainage:	22	23	24	25	26	27	28
Ground Level (m):	70.90	71.25	70.80	70.45	70.20	70.35	69.10

Upward gradient of 1 in 200

6. Calculate the quantities of following items of work for a RCC slab culvert of 1.50-metre span and 4.00-metre roadway from the given drawing. 3+3+5+5+5

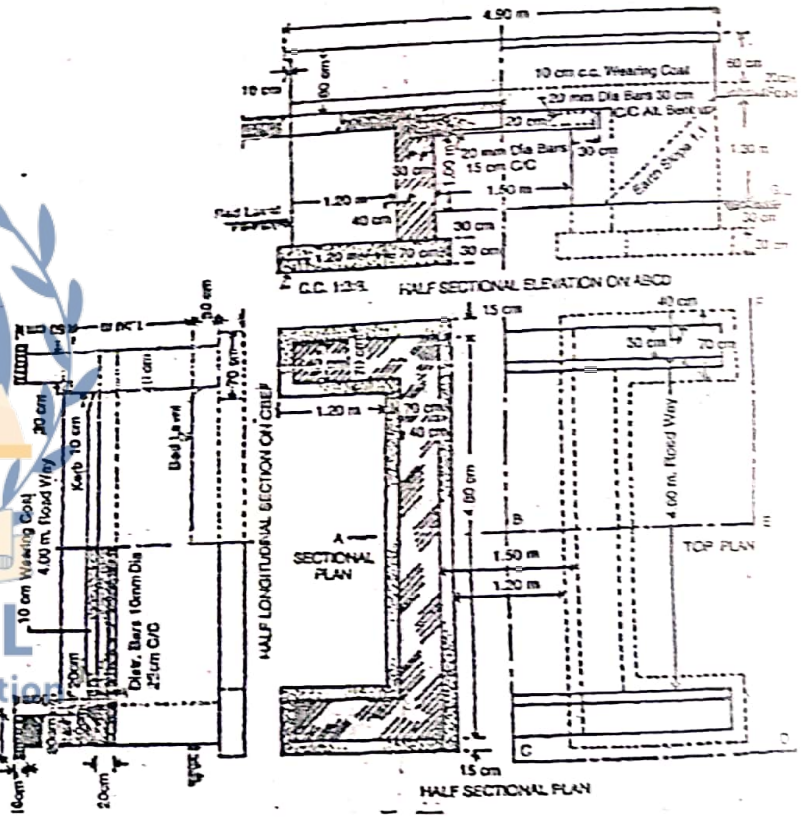
(i) Earthwork in excavation in foundation
(ii) First class Brickwork in 1:4 c/m
(iii) Mild steel reinforcement bar for RCC works
(iv) Cement pointing in 1:2 c/m on exposed surface of brick masonry

7(a) An RCC framed structure building having estimated future life 70 years fetches a gross annual rent of NRs. 6,700/- per month. Work out its capitalized value on the basis of 6% net yield. The rate of compound interest for sinking fund may be taken as 4%. The land plot of above building measure 1400 sq.m and cost of land may be taken to be NRs. 1,500/- per sq.m. The other outgoings are:

(i) Repair and maintenance: 0.1% of gross income
(ii) Municipal tax and property tax: 25% of gross income
(iii) Management and miscellaneous charges: 7% of gross income

The plinth area of building is 800 sq.m and plinth area rate of above type of building may be taken as NRs. 8,700/- per sq.m. 7

(b) Write short notes on:
(i) Sinking Fund
(ii) Depreciation



PURBANCHAL UNIVERSITY
2018

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG469EI: Environmental Impact Assessment (Elective-I) *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) What are the principles on which EIA is based on? Explain different methods of impact identification during EIA study in Nepal. 8

(b) Draw EIA cycle. How do you link between the project cycle and EIA? Illustrate with suitable examples. 8

2(a) Explain the statement "Scoping is the heart of the EIA process". Explain different steps that are used in Environmental scoping 8

(b) What do you understand by IEE? Describe the steps of IEE process. 8

3(a) Describe the objectives of environmental monitoring. What are the types of monitoring carried out in EIA. 8

(b) What are the possible adverse impacts in construction of a Rural Project? Explain with integration measures. 8

4. A settlement is at a distance of 1000m from a proposed site of brick factory. It consumes 120 tonnes of coal per hour and discharges the combustion products through a chimney of effective height of 95m. The sulphur content of the coal is 4%. Predict the ground level concentration of SO_2 in and around the settlement. The horizontal and vertical plume standard deviation at 1000m downwind direction is 120m and 75m respectively. The wind speed at the top of the stack is 4m/sec. If the recommended ambient SO_2 concentration is 150 $\mu g/m^3$, will there be any impact on the health of people? 16

Contd. ...

5(a) What is TOR? Discuss briefly about the format of TOR used in Nepal. 8

(b) Define EMP. What are the aims of EMP? Describe the composition and responsibilities of construction phase environmental management team. 8

6(a) Why public participation is the key factor during EIA? How it is conducted? 8

(b) Write short notes on any TWO: 4+4

(i) Environmental auditing

(ii) Screening

(iii) Impact prediction methods

(iv) EIA review procedure in Nepal

PURBANCHAL UNIVERSITY
2017

B.E. (Civil)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG469EI: Environmental Impact Assessment (Elective-I) *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Explain the importance and role of public participation in EA study. 8

(b) Give the history of development of EIA in context of Nepal and world. 8

2(a) Explain EIA cycle and give the proper linkage of EIA and project cycle. 8

(b) What are the different Environmental screening criteria used in Nepal? Explain briefly. 8

3(a) List out the different principles and objectives of EPMs. Explain the different types of EPMs. 8

(b) Define project area. Why it is very important to collect the baseline data before the implementation of the project during the EA study? 8

4. Differentiate between: 4+4

(i) Impact monitoring and compliance monitoring

(ii) EIA and IEE

(b) Explain the statement "Environmental Scoping is the heart of EIA study process." 8

5(a) A cement factory burns 5 tons of coal per hour and discharges the combustion products through a stack that has effective height of 75m. The sulfur content of coal is 4.5%. The wind velocity at the top of the stack is 6.0 m/sec. The atmospheric

Contd. ...

conditions are moderately to slightly stable. Predict the impact on air environment at 860m downwind distance. The guideline states that if the concentration of SO_2 (sulfur dioxide) exceeds 300μg/m³ 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 860 m is 87m and 52 m respectively. 8

(b) Write short note on EMAP. What are the different models used in impact prediction? 2+6

6. Write short notes on any FOUR: 4×4=16

(a) Environmental Auditing

(b) Environment and environment law

(c) Legal provisions to Public participation in EIA process in Nepal

(d) Alternative Analysis

(e) ETA report review process

PURBANCHAL UNIVERSITY
2015

B.E. (Civil)/Eighth Semester/*Back*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG462CI: Environmental Impact Assessment (EIA) *(Elective-II) (Old Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question are specified along its side.

Assume necessary data if required. Relevant Masonry Codes are allowed.

Answer FIVE questions.

a) What are the major functions and benefits of EIA? Describe the various steps involved in EIA process. 5+3

b) What is screening in EIA? Discuss different criteria that are used for screening in Nepal. 2+6

c) What is the linkage between project cycle and EIA? Why do you have to carryout EIA before the detailed design work? 5+3

d) What are different types of Impact considered in EIA? Explain with examples. 8

a) What do you mean by baseline study? Explain with examples. Why do you think it is important? Express your views. 4+4

b) A cement manufacturing plant burns coal at the rate of 7 tonnes per hour and discharges the foul gases through a chimney having physical height of 80 m. The coal has a sulphur content of 5% and plume rise is 10 m. The wind velocity at the top of the stack is 7.5m/s. The atmospheric conditions are slightly unstable. Determine the maximum ground level concentration of SO2 and the distance from the stack at which it occurs. 8

a) The sound pressure level (SPL) that is produced within the range of 50 m in the construction site is 80 dB. The residential area lies 150m away from the project area. Calculate the SPL that reaches to the residential area due to the construction activities if 35% of the SPL is reduced by the trees that are around the construction area. 8

Contd. ...

PURBANCHAL UNIVERSITY
2015

B.E. (Civil)/Seventh Semester/*Chance/Old Course*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG462CI: Environmental Impact Assessment (EIA) *(Elective-I)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks.

Assume necessary data if required. Relevant Masonry Codes are allowed.

Answer FIVE questions. 5×16=80

1(a) What is EIA? Give its history of development in context of Nepal? 8

(b) What are the objectives of ETA? What are the types of ETA based on the level of application? 8

2(a) Explain the statement "The beauty of EIA is public participation." Give the proper linkage of EIA and project cycle. 8

(b) What is environmental screening? What are the different criteria used in environmental screening in Nepal? 8

3(a) Explain that the environmental scoping is the heart of an EIA process. 8

(b) Suppose that you are given for carrying out the IEE for irrigation Terai of Nepal. Prepare the typical checklist for beneficial and adverse impacts for that project considering the different potential impact area during construction and operational stage of the project. 8

4(a) What is the role of the environmental monitoring? Differentiate between the environmental monitoring and environmental evaluation? 8

(b) Discuss briefly about the types of impact identification methods. 8

Contd. ...

5(a) Define stakeholders. Who are the different stakeholders involved in EIA study? 8

(b) What is environmental auditing? What is the role of Ministry of Environment in auditing process? Explain different environmental auditing types. 8

6(a) Determine the dilution ratio and BOD_5 concentration of an effluent sample as follows: 8

Volume of sample= 20ml
Volume of BOD bottle= 850ml
Dissolved oxygen at the beginning= 25mg/l
Dissolved oxygen at the end of incubation= 15mg/l

The incubation was done for 5 days at 20°C.

(b) Describe review criteria of EIA report. Also describe EMAP. 4+4

(b) Why Public participation is essential in EIA study? Explain. 8

5(a) Discuss on the importance and principles of EPMs. Explain the different types of EPMs. 4+4

(b) Describe the types of environmental audits. What are the activities involved in an auditing process? Explain. 4+4

6. Write short notes on any FOUR: 4×4=16

(a) IEE
(b) Mitigation measures
(c) Environmental Monitoring
(d) ToR for EIA
(e) Scoping of EIA

PURBANCHAL UNIVERSITY

2015

B.E. (Civil)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG469EI: Environmental Impact Assessment (Elective-I) *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side.

Answer FIVE questions.

1(a) Beauty of EIA is public participation. Explain the statement. 8

(b) Draw the diagram of EIA steps in Nepal. 8

2(a) What is Project area? Discuss about the project cycle. 8

(b) What are the different stakeholder involved in EIA study? 8

3(a) What is environmental scoping? What are its aims? Discuss about the content of the scoping documents. 8

(b) Explain different types of environmental auditing. 8

4(a) Discuss on Impact Prediction? What are the different method used in Impact Prediction? 8

(b) Give comparison between: 4+4
(i) EIA and IEE study
(ii) Effects and impacts

5(a) What are the factor to be considered while prescribing mitigation measures? What are different types of mitigation measures? State the possible generic mitigation measures that you will prescribe for a road project. 8

(b) Discuss about EIA review procedure in Nepal. 8

6. Write short notes on any FOUR: 4×4=16
(a) Environmental Screening.
(b) History of EIA development in Nepal
(c) Environmental Monitoring
(d) Format of TOR in Nepal
(e) EMAP