ANJUMAN-I-ISLAM'S

AIKTC KALSEKAR TECHNICAL CAMPUS

INNOVATIVE TEACHING · EXUBERANT LEARNING

Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2017-18/   Date: _____

School: **SoET-CBSGS**   **Branch:**   **CIVIL ENGG.**   **SEM:**   **V**

To,
Exam Controller,

AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format SC	Format HC	No. of Copies
1	Structural Analysis – II	CE-C501		✓	02
2	Geotechnical Engg.	CE-C502		✓	02
3	Bldg. Design And Drawing – II	CE-C503		✓	02
4	Applied Hydrolics-I	CE-C504		✓	02
5	Transportation Engg. – I	CE-C505		✓	02
6	Employment & Corporate Skills	CE-C506			

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

(3 HOURS)   [TOTAL MARKS 80]
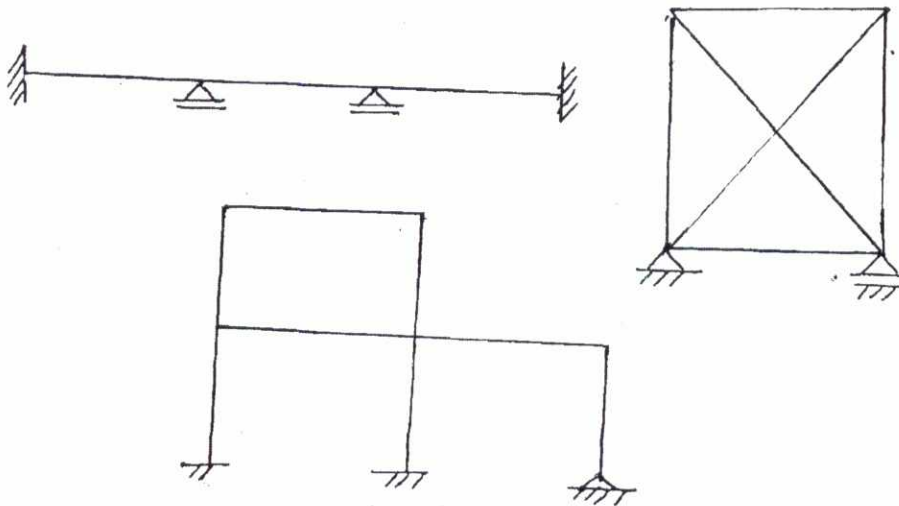
Please Note:

   1) Question no 1 is compulsary
   2) Attempt any three questions from remaining questions
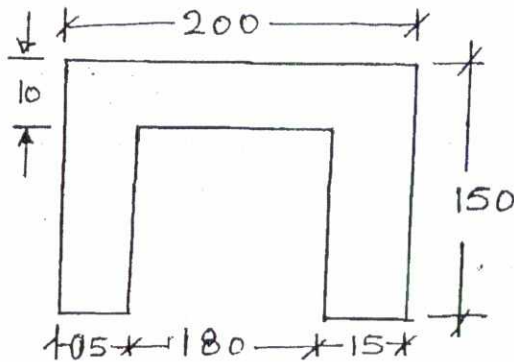   3) Assume suitable data if required and justify the same.

Q1.   Attempt following
(a)   Find degree of static and kinematic indeterminacy of following   06
           structures


(b)   Find the shape factor of the section shown in following figure.   08

(c)   For the rigid frame subjected to temperature variation shown in   06
           figure. Fine horizontal deflection at A.   Assume depth of all
           members   as   400mm.   Take $\alpha = 12 \times 10^{-6}/0_c$.   All
           temperatures in degree centigrade.

                AB = 4m
                BC = 2m

                                                      TURN OVER
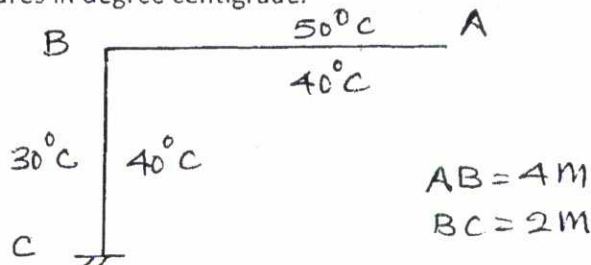
Q2   (a)   Explain the application of virtual method with suitable example.   05

     (b)   Analyse the following frame by moment distribution method and draw bending moment diagram.   15
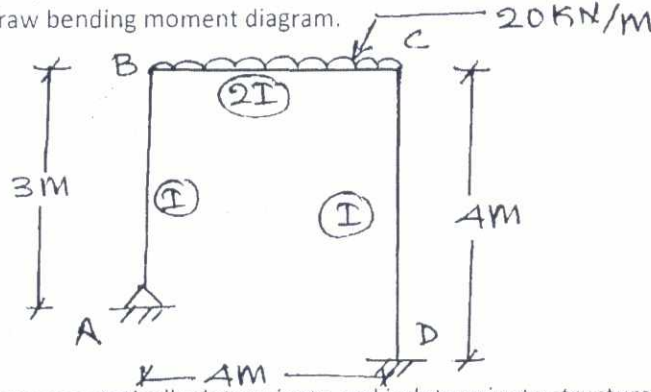
Q3   (a)   Compare statically determinate and indeterminate structures.   05

     (b)   Analyse the following frame by slope deflection method and draw bending moment diagram.   15
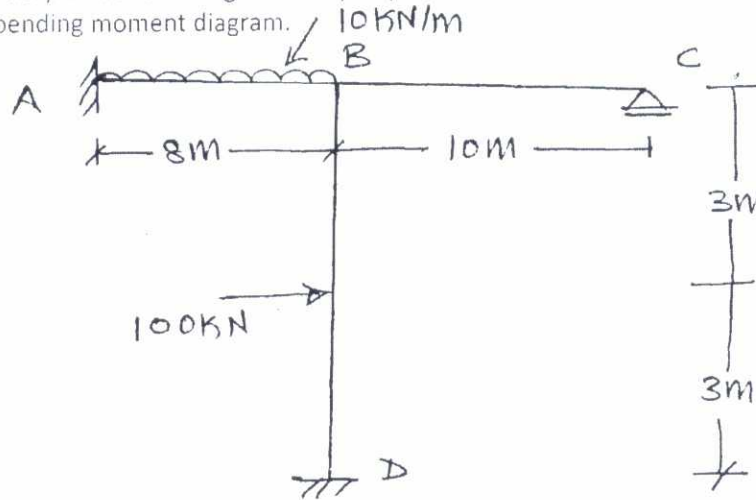
Q4   (a)   Using stiffness method analyse the following beam and draw bending moment diagram.   10
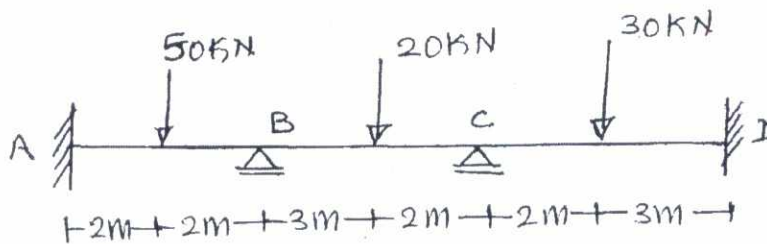
TURN OVER

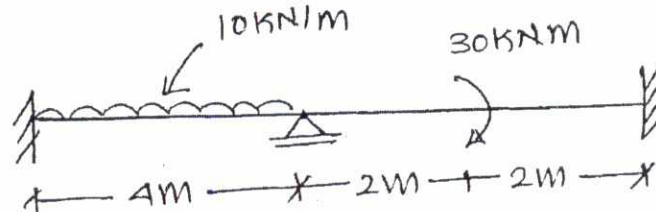(b) Analyse the following beam using theorem of three moments and draw bending moment diagram.   10

Q5 (a) A two hinged parabolic arch of span 20 m and rise 6 m carries a UDL of 20 kN/m over the right half span and concentrated load of 75 kN at crown. Analyse the arch and and draw bending moment diagram   10

(b) Determine the collapse load for the beam shown in following figure.   10
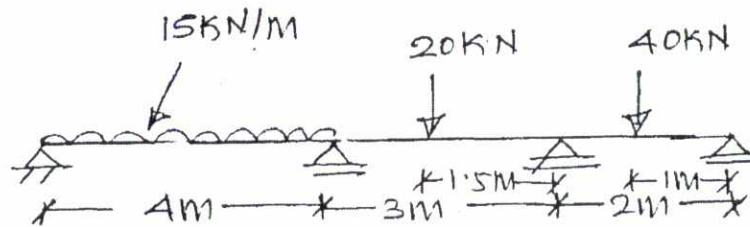
Q6 (a) Develop flexibility matrix for the member shown in figure withreference to coordinates shown in figure.   10
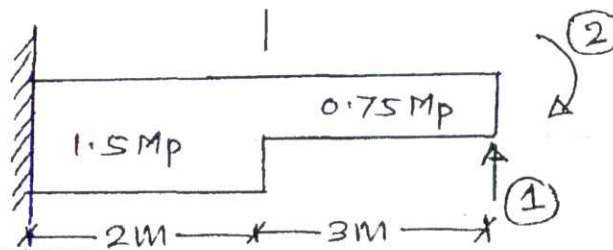
(b) Explain following terms   10
1. Shape factor
2. Carry over moment
3. Distribution factor
4. Anti symmetrical loading

Paper / Subject Code: 30204 / GEOTECHNICAL ENGINEERING-I

(3 Hours)   Marks : 80

N. B.:   (1) Question No. 1 is compulsory.

(2) Attempt any three from remaining five questions.

(3) Figures to the right indicate the full marks.

(4) Assume suitable data if not given and justify the same.

Q. 1   A.   Write the characteristics of flow net.   05

B.   Draw the plasticity chart and explain its use in classification of fine grained soil.   05

C.   Define soil mechanics, geotechnical engineering, cohesive & cohesionless soil.   05

D.   Write the use of compaction.   05

Q. 2   A.   Establish the equation with parameters γ_d, n_a, G, γ_w and w. Notations have usual   05
meaning.

B.   Explain the shrinkage ratio, volumetric shrinkage and shrinkage index.   05

C.   Derive expressions for horizontal and vertical equivalent permeability for a   10
stratified soil deposit using usual notations.

Q. 3   A.   A sample of clay with a weight of 6.7 N was coated with paraffin wax. The   10
combined weight of clay and wax was found to be 6.78 N. The volume of wax
coated sample was found by immersion in water to be 350000 mm³. The sample
was then broken and moisture content was found to be 16%. If the G value of
soil and wax are 2.67 and 0.89 respectively, determine the bulk unit weight, void
ratio and degree of saturation of sample.

B.   For the given data classify the following soils as per IS 1498:   10
(a) Liquid limit : 41%, Plastic Limit: 21%
(b) Liquid limit : 20%, Plastic Limit: 14%
(c) Passing 4.75 mm sieve = 71%, Passing 75 μ sieve = 9%, C_u = 7,
C_c = 2.9, I_p = 3.

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58502

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Q. 4. A. A saturated specimen of cohesionless sand was tested in triaxial compression   10
and the sample failed at a deviator stress of 482 kN/m^2 when the cell pressure
was 100 kN/m^2, under the drained conditions. Find the effective angle of
shearing resistance of sand. What would be the deviator stress and the major
principal stress at failure for another identical specimen of sand, if it is tested
under cell pressure of 200 kN/m^2?

B. Explain the static cone penetration test.   05

C. Explain the procedure to compute the pre-consolidation pressure using   05
Cassagrand's method.

Q. 5 A. From a Proctor's compaction test the maximum dry density was found to be 1.75   10
gm/cc and OMC 14.5%. The specific gravity of soil grains is 2.6.

(a) Find out the Degree of Saturation and percentage air voids at the optimum
state.

(b) A specimen 10 cm in diameter, 20 cm in height is to be prepared for triaxial
test with same soil by static compaction to correspond to the optimum state. Find
out the weights of the oven dried soil and water required for the specimen.

B. A layer of soft clay is 5 m thick and lies under a newly constructed building. The   10
weight of sand overlying the newly clayey layer produces a pressure of 260
kN/m^2 and the new construction increases the pressure by 100 kN/m^2. If the
compression index is 0.45, compute the settlement. Water content is 40% and G
= 2.65

Q. 6 A. In a falling head permeability test, head causing flow was initially 60 cm and   05
drop 3 cm in 5 minutes. What will be the time required for the head to fall from
60 cm to 30 cm?

B. Explain the bore log with proper representation.   05

C. Explain how to determine the liquid limit using Cassagrand's apparatus.   05

D. Write the use of particle size distribution curve.   05

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Paper / Subject Code: 30205 / BUILDING DESIGN & DRAWING - II

(4 Hrs.)   **(Max.Marks:80)**

N.B. (1) Question no.1 is compulsory
   (2) Answer any three(03) questions from the remaining questions
   (3) All questions carry equal marks

1. Draw **the plan** of **Hospital building** in city area, as **(G+1) R.C.C framed structure only** on PLOT of 50 m.x 55 m.

   Requirements of the various units as per follows:-

1) Consulting Room	**2 No.** -each 20 m^2
2) Male Ward	-100 m^2
3) Female Ward	-100 m^2
4) Operation Theatre	-30 m^2
5) Special Rooms	**3 No.**- each 20 m^2
6) I.C.U	- 50 m^2
7) Pathology Lab	-20 m^2
8) Medical Store	-20 m^2
9) Administrative Unit	- 30 m^2
10) Nurse Room	-20 m^2

Provide adequate passage, staircase, sanitary units as per byelaws. Assume floor to floor height as **3.6 m** provide adequate passages, Staircases, Toilet/sanitary units as per the bye-laws.
Draw the following according to some suitable scale.

(a) GROUND FLOOR PLAN   15
(b) Line Plan of First Floor   05

2. Draw the Sectional Elevation for the building you have planned in Q.no.1   20

3. Draw the **Two-point** perspective for the building you have planned in Q.no.1
Assume the eye level at 2.2m. from Ground level .   20

4. (a) Write detailed Principles of Town Planning   10

   (b)Draw front elevation of the planned building in Q.1   10

5. Draw the **One- point** –perspective for a workshop with the following data :   20
   Size of workshop = 5 m x15 m
   Height of workshop = 4m (excluding pitched Roof)
   Eye level = 2m , from G.L
   Plinth Level = 0.6 m from G.L

6. (a) Draw the detailed foundation plan with a section of a one footing for the building, you have planned in Q.No.1   12

   (b) Write detailed notes on Modular planning   08

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T·E - sem - Ⅴ - civil - CBSGS   22/11/18

Paper / Subject Code: 30202 / APPLIED HYDRAULICS - I

Q.P. Code: 25343

(3 hours)   **Total marks: 80**

N.B.: (1) Question no.1 is compulsory.

(2) Attempt any 3 questions out of the remaining 5 questions.

(3) Assume data wherever necessary and clearly mention the assumptions made.

(4) Draw neat figures as required.

Q1   Solve any four from the following   **20**

a Explain moment of momentum equation and its practical applications.
b What do you understand by scale effect in models?
c Write a short note on the unit quantities of a turbine.
d What is meant by multistaging of pumps?
e Show that maximum efficiency of propulsion is 50% when the inlet orifices are at right angles to the direction of motion of ship.
f Explain the working principle of hydraulic accumulator.

Q2 a A lawn sprinkler has two nozzles of diameters 3 mm each is connected across a tap of   **10**
water. The nozzles are at distance of 40 cm and 30 cm from the centre of the tap. The rate of flow of water through the tap is 100 cm³/s. The nozzles discharge water in the downward directions. Determine the torque required to hold the rotating arm stationary. Also determine the angular speed at which the sprinkler will rotate free.

b. 250 litres/s of water is flowing in a pipe having a diameter of 300 mm. If the pipe is   **10**
bent by 135 degrees, find the magnitude and direction of the resultant force on the bend. The pressure of flowing water is 39.24 N/cm².

Q3 a Derive on the basis of dimensional analysis suitable parameters to present the thrust   **10**
developed by a propeller. Assume that the thrust P depends on the angular velocity ω, speed of advance V, diameter D, dynamic viscosity μ, mass density ρ, elasticity of the fluid medium which can be denoted by the speed of the sound in the medium C.

b A 7.2 m height and 15 m long spillway discharges 94 m³/s discharge under a head of   **10**
2.0 m. If a 1:9 model of this spillway is to be constructed, determine model dimensions, head over spillway model and the model discharge. If model experiences a force of 7500 N (764.53 kgf), determine force on the prototype.

TURN OVER

Q4 a A jet propelled boat, moving with a velocity of 5 m/s, draws water amid-ship. The   10
water is discharged through two jets provided at the back of the ship. The diameter of
each jet is 150 mm. The total resistance offered to the motion of the boat is 4905 N.
Determine (i) Volume of water drawn by the pump per second.
(ii) Efficiency of the jet propulsion.

b A jet of water having a velocity of 20 m/s strikes a curved vane, which is moving with   10
a velocity of 10 m/s. The jet makes an angle of 20 degrees with the direction of motion
of vanes at inlet and leaves at an angle of 130 degrees to the direction of motion of
vanes at outlet. Calculate
   (i)   Angle of vanes at inlet and outlet so that the water enters and leaves the
          vane without shock.
   (ii)   Work done per second/unit weight of water striking the vanes per second.

Q5 a A Pelton wheel is to be designed for the following specifications: 10
Shaft power = 11,772 kW; Head =380 meters; Speed = 750 r.p.m.; Overall efficiency
= 86%; Jet diameter not to exceed one sixth of the wheel diameter. Take K_{v1} = 0.985
and K_{u1} = 0.45.
Determine:
   (i)   The wheel diameter
   (ii)   The number of jets required
   (iii) Diameter of the jet

b A Kaplan turbine runner is to be designed to develop 9100kW. The net available head   10
is 5.6m. If the speed ratio = 2.09, flow ratio = 0.68, overall efficiency 86% and the
diameter of the boss is 1/3 the diameter of runner. Find the diameter of the runner, its
speed and the specific speed of the turbine.

Q6 a A centrifugal pump with 1.2 m diameter runs at 200 r.p.m and pumps 1880 lps, the   10
manometric head being 6 m. The angle which the vanes make at exit with the tangent
to the impeller is 26^0 and the radial velocity of flow is 2.5 m/s. Determine the
manometric efficiency and the least speed to start pumping against a head of 6 m, the
inner diameter of the impeller being 0.6 m.

b Write short notes on   10
   (i)   Hydraulic press
   (ii)   Hydraulic intensifier

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Paper / Subject Code: 30203 / TRANSPORTATION ENGINEERING - I

Q. P. Code: 24401

(3 Hours)   Total Marks: 80

Note: i. **Q. No. 1 is compulsory**
           ii. Attempt **any** 3 out of **remaining 5**
           iii. Support all **theory and numerical** with **neat sketch**

1. A Calculate corrected runway length for basic runway length of 4100 meter at an airport   (10 M)
       site located at 150m above M.S.L. The airport reference temperature is 32.30° C and standard
       atmospheric temperature is 33.80° C. consider site is horizontal. Also draw layout of airport
       with scale of 1cm = 500m use corrected runway length. Take airport area of 4 km x 3 km
       and show all airport elements. Assume wind is calm in all the direction throughout the year.

    B Write a note on (any 2)   (10 M)
    i   Importance of water transportation in India.
    ii   Marshalling yard.
    iii   Classification of signals.

2. A Discuss characteristics of Concrete, Timber and cast-iron sleepers on basis of   (08M)
       suitability, durability, cost and weight.
    B What are 3 controls of aircraft?   (06 M)
    C Explain Tram-line method of laying railway line.   (06 M)

3. A Explain Negative Super elevation with neat sketch and find the speed on main curve if a   (08 M)
       5° curve diverges from a 3° main curve on a B.G yard assuming the speed of branch line
       Is 35kmph.

    B Discuss Instrumental landing system with sketch.   (06M)
    C Write note on airport drainage.   (06M)

4. A What is ANC and TNC? Design 1in 8.5 turnout on B.G track which takes off from toe   (08 M)
       and passes through TNC. Assume heel divergence as 11.4cm.
    B Write a note on breakwaters.   (06M)
    C Discuss on airport lighting.   (06M)

5. A Design an exit taxiway connecting runway and parallel taxiway for total angle of   (08M)
       turning as 35°. Turning speed is 80kmph, take coefficient of friction as 0.12. assume any
       other data if required.
    B Explain dry docks and also compare ports and harbor.   (06 M)
    C Explain various theories of creep.   (06 M)

6. A Design the number of gates to serve three classes of aircraft for obtaining Combined handling   (05 M)
       capacity of all the gates as 20 aircrafts per hour. Use following data, assuming that each gate is
       available for all the aircrafts class. assume any other data if required.

Aircraft class	Mix (%)	Average Occupancy Time (min)
1	15	25
2	35	45
3	50	60

B	Write note on any 3	(15 M)
i	Types of rails.	
ii	Konkan railway	
iii	Dolphin	
iv	Jetty and wharves	
v	Classification of airport as per ICAO	

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