

320452(20)

B. E. (Fourth Semester) Examination, April-May 2020

(New Scheme)

(Civil Engg. Branch)

FLUID MECHANICS-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d) of each question.

Unit-I

1. (a) Define free & wall turbulence. 2

- (b) Derive the velocity distribution equation for turbulent flow in smooth pipes. 7

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- (c) A smooth pipe of diameter 80 mm & 800 m long carries water at a rate of 0.480 m³/minute. Calculate the loss of head, wall shear stress, centre line velocity, velocity & shear stress at 30 mm pipe wall. Also calculate the thickness of laminar sub-layer. Take kinematic viscosity of water as 0.015 stokes. Take the value of coefficient of friction f from the relation given as $f = 0.0791/(\text{Re})^{1/4}$, where Re = Reynold's no. 7
- (d) Write short note on Hardy-cross method. 7

Unit-II

2. (a) Define laminar boundary layer & turbulent boundary layer. 2
- (b) A kite 0.8 m × 0.8 m weighing 0.4 kg assumes an angle of 12° to the horizontal. The string is attached to the kite makes an angle of 45° to the horizontal. The pull on the string is 2.5 kg when the wind is flowing at a speed of 30 km/hr. Find the corresponding coefficients of drag & lift. Specific weight of air is given as 1.25 kg/m³. 7
- (c) Derive the expression for Von Karman integral equation. 7

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- (d) Explain the phenomenon of boundary layer separation. 7

Unit-III

3. (a) Subcritical & supercritical flow. 2
- (b) Explain specific energy curve with neat sketch. 7
- (c) Derive the equation for gradually varied flow. 7
- (d) The depth of flow of water, at a certain section of a rectangular channel of 2 m wide, is 0.3 m. The discharge through the channel is 1.5 m³/s. Determine whether a hydraulic jump will occur and if so, find its height and loss of energy per kg of water. 7

Unit-IV

4. (a) Define Dimensional analysis. 2
- (b) The frictional torque T of a disc of diameter D rotating at a speed N in a fluid of viscosity μ and density ρ in a turbulent flow is given by :

$$T = D^5 N^2 \rho \phi \left[\frac{\mu}{D^2 N \rho} \right]$$

Prove this by the method of Buckingham's π -theorem. 7

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(c) Explain the different dimensionless number and their significance. 7

(d) A valve is provided at the end of a cast iron pipe of diameter 150 mm and of thickness 10 mm. The water is flowing through the pipe, which is suddenly stopped by closing the valve. Find the maximum velocity of water, when the rise of pressure due to sudden closure of valve is 196.2 N/cm^2 . Take K for water as $19.62 \times 10^4 \text{ N/cm}^2$ and E for cast iron pipe as $11.772 \times 10^6 \text{ N/cm}^2$. 7

Unit-V

5. (a) Define specific speed of a centrifugal pump. 2

(b) A turbine is to operate under a head of 25 m and run at 200 rpm. The discharge is 9 cumecs. If the overall efficiency is 90% determine : 7

(i) Specific speed of turbine

(ii) Power generated

(iii) Type of turbine

(c) Obtain an expressions for unit speed, unit discharge and unit power of turbine. 7

(d) Discuss characteristics cruves of turbine in brief. 7

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B. E. (Fourth Semester) Examination,

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SURVEYING-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Answer any two parts from (b), (c) and (d).

*** Unit-I**

1. (a) Define triangulation and trilateration. 2
- (b) The altitude of two proposed station *A* and *B*,

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100 km apart, are respectively 420 m and 700 m. The intervening situated at C, 70 km from A has an elevation of 478 m. Ascertain if A and B are inter visible, and, if necessary, find how much B should be raised so that the line of sight must nowhere be less than 3 m above the surface of the ground. 7

- (c) Write short notes on any two of the following : 7
- (i) Reconnaissance of triangulation
 - (ii) Classification of triangulation system
 - (iii) Strength of figure
- (d) What are the types of correction to be applied in base line? Explain with formula. 7

Unit-II

2. (a) Define the principle of least square in survey adjustment. 2
- (b) Define the following : 7
- (i) Independent quantity
 - (ii) Conditional quantity
 - (iii) Residual error
 - (iv) Most probable error

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- (v) Most probable value
 - (vi) Normal equation
 - (vii) Conditional equation
- (c) The angles of triangle ABC were recorded as follows :

Angle	Weight
$A = 77^{\circ}14'20''$	4
$B = 49^{\circ}40'35''$	3
$C = 53^{\circ}04'52''$	2

Give the corrected values of the angles. 7

- (d) Explain in detail notes on adjustment triangulation figure. 7

Unit-III

3. (a) Write short note on range finders. 2
- (b) Derive an expression for distance and elevation for inclined sights when staff is held normal. 7
- (c) Write short notes on any two : 7
- (i) Total station
 - (ii) Geodimeter and tellurometer

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- (iii) Multiplying constant and additive constant
- (d) Subtense theodolite
- (d) A tacheometer was set up at a station C and the following readings were obtained on a vertically held staff.

Inst Station	Staff station	Vertical angle	Hair reading
C	BM	$-5^{\circ}20'$	1.150, 1.80, 2.450
C	D	$+8^{\circ}12'$	0.750, 1.500, 2.250

The constant of instrument were 100 and 0.15.
Find the horizontal distance CD and RL of BM is 750.500 m.

7

Unit-IV

- 4. (a) What is meant by phototheodolite? Where it is used? 2
- (b) Define : any four : 7
 - (i) Photographic surveying
 - (ii) GIS
 - (iii) Tilt
 - (iv) Exposure station
 - (v) Vertical photograph

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- (c) A section line AB appears to be 10.16 cm on a photograph for which the focal length is 16 cm. The corresponding line measures 2.54 cm on a map which is to a scale 1/50,000. The terrain has an average elevation of 200 m above mean sea level. Calculate the flying altitude of the aircraft, above mean sea level, when the photograph was taken. 7
- (d) Differentiate at least 7 points between stereo photogrammetric and aerial surveying. 7

Unit-V

- 5. (a) What is fathometer? 2
- (b) Define the purpose of hydrographic surveying? Write a short note on three point problem in hydrographic survey. 7
- (c) A, B and C are three visible stations in a hydrographic survey. The computed sides of triangle ABC are $AB = 1130$ m, $BC = 1372$ m, and $CA = 1889$ m. Outside of this triangle (and nearer to AC) a station P is established and its position is to be found by three-point resection on A, B and C. The angles APB and BPC being $42^{\circ}35'$ and $54^{\circ}20'$. Determine PA and PC. 7

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(d) Explain the method of locating soundings in hydrographic surveying.

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CIVIL ENGINEERING DRAWING

Time Allowed : Four hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from parts (b), (c) and (d).

Unit-I

1. (a) What do you understand by Elegance? 2
- (b) Write the site selection requirement of a canteen. 7

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- (c) Write the municipal regulations and by laws for residential buildings. 7
- (d) Explain the following terms : 7
- (i) Roominess
 - (ii) Aspect
 - (iii) Privacy
 - (iv) Economy

Unit-II

2. (a) What do you understand by single line plan? 2
- (b) Draw a single line plan of a canteen. 7
- (c) Draw a plan of 1 BHK. 7
- (d) Draw a line plan of primary health centre. 7

Unit-III

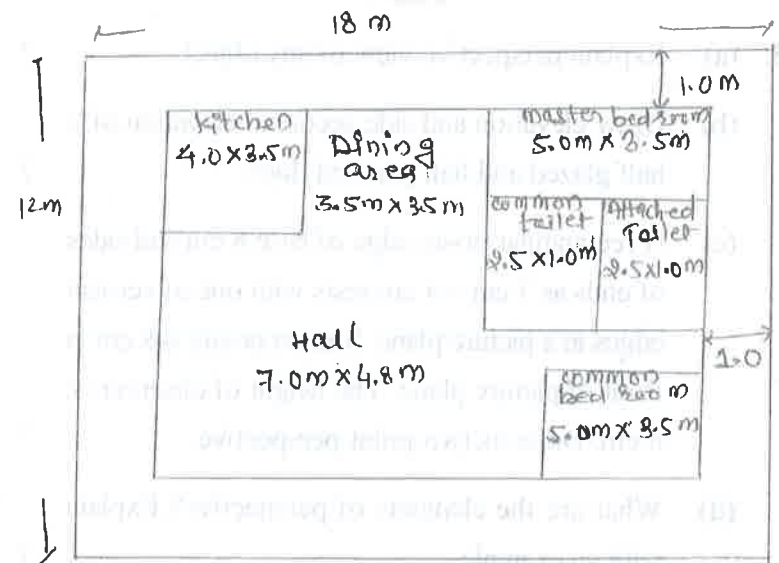
3. (a) What do you mean by front elevation of a building? 2
- (b) Draw the front elevation of 1 BHK which is given in question no. unit-II(c). 7
- (c) Draw the plan and elevation of primary school. 7

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- (d) Draw the line plan of hostel for 50 students and draw its elevation. 7

Unit-IV

4. (a) Define "Plinth area". 2
- (b) Draw the plan showing all details for a building of which line plan is given in figure and draw its sectional view. 14



- (c) Using suitable scale draw the plan for a single storey residential building with the following requirements : And draw its sectional view
- (i) Plot size = 20 m × 18 m
 - (ii) Two bed rooms = 4 m × 5 m
 - (iii) One living room = 7 m × 6 m
 - (iv) Kitchen = 3 m × 3.5 m
 - (v) Front and rear verandah = 2.5 m wide 14

Unit-V

5. (a) Explain perspective view of any object. 2
- (b) Draw elevation and side sectional elevation of a half glazed and half paneted door. 7
- (c) A rectangular prism edge of base 8 cm and sides of ends as 3 cm × 4 cm rests with one of vertical edges in a picture plane. Station points is 8 cm in front of picture plane. The height of observer is 6 cm. Draw its two point perspective. 7
- (d) What are the elements of perspective? Explain with an example. 7

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B. E. (Fourth Semester) Examination, April-May 2020

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BUILDING CONSTRUCTION

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory and carries 2 marks. Attempt any **two** parts from (b), (c) and (d) which carry 7 marks each.

Unit-I

1. (a) What is the purpose of foundation? 2
- (b) What are the different causes of failure of foundation? 7

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- (c) Explain the comparative advantages and disadvantages of casts-in-situ and pre-cast piles. 7
- (d) Draw neat sketch of pier foundation and why and where it is provided. 7

Unit-II

2. (a) What is Brick Masonry? 2
- (b) What is stone masonry, draw neat sketch and explain uncoursed random rubble masonry? 7
- (c) What are the advantages of providing cavity wall, explain the reasons of providing cavity in wall with neat sketch. 7
- (d) Draw neat sketch of fully panelled door, label its various components. 7

Unit-III

3. (a) What are the essential requirements of floor? 2
- (b) What is flag stone flooring, draw neat sketch? What are its advantages & disadvantages? 7
- (c) What is Roof? What are its various types, explain with neat sketches? 7

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- (d) What are the various requirements of good form work? 7

Unit-IV

4. (a) Define the term Pointing. 2
- (b) What do you mean by damp proofing? What are the requirements of a good damp proofing material? 7
- (c) Explain with neat sketch method of D.P.C. for roof. 7
- (d) Explain in detail various defects occur in plastering work. 7

Unit-V

5. (a) What do you understand by Staircase? 2
- (b) What are the requirements of good acoustic material? 7
- (c) What do you understand by proportioning of stairs? 7
- (d) Differentiate between :
Dog legged and Open newel stair. 7

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B. E. (Fourth Semester) Examination, April-May 2020

(New Scheme)

(Civil Engg. Branch)

TRANSPORTATION ENGINEERING-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any one part from (b) and (c).

Unit-I

1. (a) Define Alignment. 2
- (b) What are the salient features of early Roman Roads?
How do these differ from the present day road
construction? 14

(c) Enumerate the steps for practical design of super elevation. 14

Unit-II

- 2. (a) What is Rotary Intersection? 2
- (b) What are the different causes of traffic accidents? 14
- (c) Explain the relationship between speed, time, volume, density and capacity. 14

Unit-III

- 3. (a) Define Flexible Pavement. 2
- (b) Explain the CBR method of pavement design. How is this method useful to determine thickness of component layers? 14
- (c) Discuss the design details of dowel bars and tie bar. 14

Unit-IV

- 4. (a) Define seal coat. 2
- (b) Explain : 14
 - (i) What are the general cases of pavement failures?
 - (ii) Write a note on Maintenance Management System.

(c) Explain the various types of failures in cement concrete pavements and their causes. 7

Unit-V

- 5. (a) Define Taxiway. 2
- (b) Give a brief account of zoning laws associated with airport planning and designing. 14
- (c) Explain : 14
 - (i) Site selection of airport
 - (ii) Hanger
 - (iii) Runway
 - (iv) Wind effect on runway