BTECH (5TH SEM) Examination, 2021
FLUID MECHANICS -I
PAPER CODE:CE501

ALLOTTED TIME:THREE HOURS

TOTAL MARKS :70

Section – 'A'
Short answer type questions

Note:- Attempt Any 05 questions. 5*5=25

1. Oil with viscosity 5 poise is used for lubrication between shaft and sleeve. The diameter of shaft is 0.5 m and it rotates at 200 rpm. Calculate the power lost in the oil for a sleeve length of 100 mm. The thickness of the oil film is 1 mm. [5]
2. Derive an expression for the depth of centre of pressure from free surface of liquid of an inclined plane surface submerged in the liquid. [5]
3. The velocity field in a fluid flow is given by $\vec{v} = 2x\hat{i} + 2y\hat{j}$. Check if the flow is possible. If possible, check if it is rotational or irrotational. [5]
4. An open channel of trapezoidal section base 1.5 m and side slope of 60^0 to the horizontal is used to convey water at a constant depth of 1 m. If the channel bed slope is 1 in 400, compute the discharge in m^3/s. Chezy's constant may be assumed as 68.45 $m^{1/2}/s$. [5]
5. The velocity field in a fluid flow is given by $\vec{v} = x^2y\hat{i} + y^2z\hat{j} + (2xyz + yz^2)\hat{k}$. Check if the flow is possible. If possible, check if it is rotational or irrotational. [5]
6. 250 liters of water is flowing through a 300 mm diameter pipe. If the pipe is bent by 135^0 in horizontal plane, as shown in figure-1, determine the magnitude and direction of the resultant force on the bend. Water pressure within the bend is 400kPa. [5]

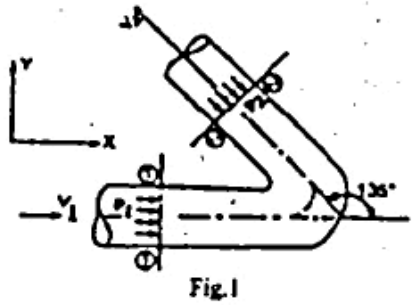

Fig.1

Section – 'B'
Long answer type questions

Note: - Attempt any 03 questions. 03*15=45

1. (a)If for a two dimensional potential flow, the velocity potential is given by $\Phi = x(2y - 1)$. Determine the velocity at the point P (4, 5).
   (b) A venturi meter with throat diameter of 150 mm is set in an inclined pipe of 300 mm diameter to measure the discharge of an oil of specific gravity 0.85 which is flowing through the pipe in upward direction. The difference in elevations of the throat section and entrance section of the venture meter is 4 cm. The differential U-tube mercury manometer shows a

gauge deflection of 25 cm. Taking the co-efficient of discharge of the venture meter as 0.95, calculate the discharge of oil flowing through the pipe.

(c) Two large fixed parallel plates are 10 mm apart. The space between the surfaces is filled with oil of dynamic viscosity (μ) of 0.036 Ns/m^2. A flat thin plate 0.3 m^2 area moves through the oil at a velocity of 0.6 m/s. Determine the viscous drag on the moving plate, when the plate is at equal distances from the fixed plates. [4+6+5]

2. (a) A manometer connects an oil pipeline and a water pipeline as shown in figure-2. Determine the difference in pressure between the two pipelines using the readings on the manometer. Use $S_{oil} = 0.86$ and $S_{Hg} = 13.6$.

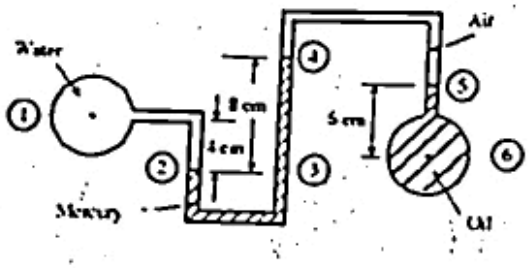

Figure-2

(b) Derive Bernoulli's equation for fluid. [8+7]

3. Determine the velocity V in the pipe if the fluid in the pipe of figure-3 is:
(a) Atmospheric air and h= 40 cm of water
(b) Water and h= 20 cm of Hg
(c) Kerosene and h= 30 cm of Hg
(d) Gasoline and h= 80 cm of Hg [3+4+4+4]

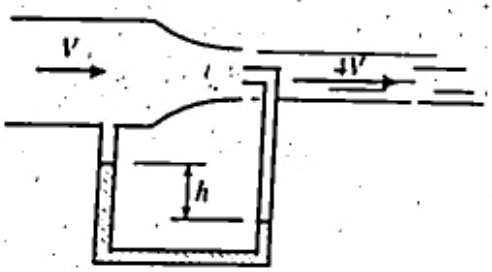

Figure-3

4. A 10-cm-diameter hose maintained at a pressure of 1600 kPa provides water from a tanker to a fire. There is a nozzle at the end of the hose that reduces the diameter to 2.5 cm. Estimate the force that the water exerts on the nozzle. The losses can be neglected in a short nozzle. [15]

BTECH (5TH SEM) Examination, 2021

Transportation Engineering- II

PAPER CODE:CE502

ALLOTTED TIME:THREE HOURS

TOTAL MARKS :70

Section – 'A'

Short answer type questions

Note:- Attempt Any 04 questions. 4*7=28

Q.01:- Explain twenty year road plan and write in brief about the classification of highways as per Bombay road plan.

Q.02:- Explain construction of Water Bound Macadam Road with neat sketch?

Q.03:-Explain the different Factor affecting the airport site selection?

Q.04:-Explain different type of joints used in rigid pavement?

Q.05:- Explain objectives of road lighting and also the design Factors of road lighting?

Q. 06:- Write in brief the step by step procedure of designing the flexible pavement as per IRC : 37-2012. Explain the equipment required for various layers while constructing the flexible pavement?

Section – 'B'

Long answer type questions

Note: - Attempt any 03 questions. 03*14=42

Q.01:- Explain importance of Fatigue and Reliability for rigid pavement design. Discuss advantages of Rigid pavement.

Q. 02:- Explain Camber. What are the objectives of providing camber ? Discuss the factors on which amount of camber depends . Also show the various shapes of camber with the help of neat sketch.

Q.03:- Derive an expression for finding super elevation of highway?

Q.04:- How bituminous mix design is done by Marshal method? Explain various criteria and test procedure with graph?

Q.05:-Write the short notes on.
i) Central Road Research Institute (CRRI)
ii) PIEV theory
iii) POR
iv) Indian Road Congress (IRC)

BTECH (5TH SEM) Examination, 2021
QUANTITY SURVEYING & COSTING
Paper-CE503

Time Allotted: Three Hours **Maximum Marks: 70**

SECTION-A

Note: *1.Attempt any 4 question from 1 to 6and each question carry 5 marks.* 4X7=28

1. What is task work? Illustrate with an example. Perform rate analysis for UCR masonary in cement mortar 1:6
2. Define mass diagram. Explain the use of mass diagram.
3. Explain in detail the different types of tenders with suitability and advantages.
4. What is the purpose of rate analysis? Prepare the abstract of items of question number.01
5. What is a contract? What are the different types of civil engineering contract? State the suitability of Item rate contract. How does the contractor quote the rate and get payment in item rate contract?
6. Enlist different methods for valuation of land? Explain Belting method of valuation for land with an example.

SECTION-B

Note: Attempt any 3 question from 7to 11and each question carry 14marks 3X14=42

7. What is the difference between brief specification and detailed specification of an item? Explain with an example. Differentiate between center line method and long wall-short Wall method.
8. What is the principle of estimating? Explain Measurement sheet. What are the different types of estimates? Describe any two of them.
9. Explain the following
   a) Revised and supplementary estimate.
   b) Plinth area rate estimate and cubical content rate estimate.
   c) Job Overheads.
10. Explain trapezoidal formula. Explain long-wall short-wall method in detail. Define contingencies. What is DPR? Discuss the content of DPR in detail.
11. Write short notes on (any THREE)

    a)Role of a quantity surveyor.
    b) Price escalation clause of contract.
    c) Earnest money deposit.
    d) Arbitration.
    e) Technical sanction

BTECH (5TH SEM) Examination, 2021
RENEWABLE ENERGY RESOURCES

Paper-CE504

Time Allotted: Three Hours **Maximum Marks: 70**

SECTION-A

Note: *1.Attempt any 4 question from 1 to 6and each question carry 5 marks.* 4X7=28

1. Explain with neat sketches, how energy from Geothermal source can be obtained in different ways.
2. Define the solar constant. What is its value?.
3. Define and explain the following:
   i) latitude angle
   ii) Hour angle iii) Declination angle iv) Day length
4. Explain energy status of India & Maharashtra and role of NCES.
5. Write short notes on : Utilization of tidal energy.

   Operational and environmental problems of geothermal energy.
6. What are liquid dominated hydrothermal resources? How these can be utilised in high temperature wet steam system?

SECTION-B

Note: Attempt any 3 question from 8to 12and each questions carry 14marks. 3X14=42

7. Describe working of Darrieus type machines with help of neat sketch and its characteristics.
   Explain wave energy conversion devices?
8. Describe working of Closed Cycle OTEC system with the help of neat sketch.
   Explain energy consumption as a measure of Nation's development.
9. Explain the term 'slope' and surface azimuth angle of a surface facing the sun and bring out how sunset hour angle is affected by the slope

   Explain vapour dominated system belongs to geothermal energy.
10. Write short notes on any TWO:

    (a) Site selection considerations for wind mill
    (b) Fuel cells
    (c) Micro-hydro power generation
11. Describe with a neat sketch the working of wind energy system showing the main components. Discuss advantages of wind energy conversion systems.
    How can wave energy be utilized?