

**MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)**

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)  
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

**II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018**Subject: Mechanics of Fluids And Hydraulic Machines

Branch: MINING

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Define specific gravity of a fluid.
2. Explain steady flow of fluid.
3. What is meant by boundary layer theory?
4. What are the advantages of impulse turbines over reaction turbines?
5. What is a pump?

**II. Answer ALL questions of the following****10x2Mark=20 Marks**

1. Explain the importance of viscosity in fluid motion and what is the effect of temperature on viscosity of water and air?
2. Explain the concept of vapor pressure and cavitation.
3. Differentiate venturimeter and orifice meter.
4. Explain Uniform and non-uniform flows with examples.
5. Explain briefly about hydraulic gradient line.
6. Explain the characteristics of laminar and turbulent boundary layers.
7. What is the condition for hydraulic efficiency of a pelton wheel to be maximum?
8. how are hydraulic turbines classified?
9. Enumerate the losses which occur when a centrifugal pump operates.
10. How are reciprocating pumps classified?

**PART-B****Answer ALL questions of the following****5x10 Marks= 50Marks****Q1. a) State and prove Pascal's law**

b) A U-tube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and the right –limb is open to the atmosphere. The centre of the pipe is 100 mm below the level of mercury (specific gravity= 13.6) in the right limb. If the difference of mercury level in the two limbs is 160 mm, determine the absolute pressure of the oil in the pipe.

**(OR)**

- Q2.** a) The surface tension of water in contact with air at  $20^{\circ}\text{C}$  is  $0.0725 \text{ N/m}$ . The pressure inside a droplet of water is to be  $0.02 \text{ N/cm}^2$  greater than the outside pressure. Calculate the diameter of the droplet of water.
- b) A differential manometer is connected at the two points A and B of two pipes as shown in figure 1. The pipe A contains a liquid of sp. gr. = 1.5 while pipe B contains a liquid of sp. gr. = 0.9. The pressures at A and B are  $1 \text{ kgf/cm}^2$  and  $1.80 \text{ kgf/cm}^2$  respectively. Find the difference in mercury level in the differential manometer

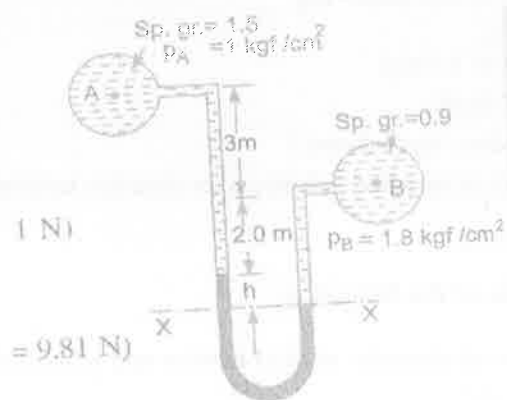


Figure 1.

- Q3.** a) Define the equation of continuity. Obtain an expression for continuity equation for a three-dimensional flow.
- b) A jet of water from a 25 mm diameter nozzle is directed vertically upwards. Assuming that the jet remains circular and neglecting any loss of energy, what will be the diameter at a point 4.5m above the nozzle, if the velocity with which the jet leaves the nozzle is  $12 \text{ m/s}$ .

(OR)

- Q4.** a) List the assumptions which are made while deriving Bernoulli's equation.
- b) Water flows at the rate of  $0.015 \text{ m}^3/\text{s}$  through a 100mm diameter orifice used in a 200mm pipe. What is the difference of pressure head between the upstream section and the vena contracta section? Take co-efficient of contraction  $C_c = 0.60$  and  $C_v = 1.0$ .
- Q5.** (a) What do you understand by the terms : Major energy loss and minor energy losses in pipes?
- b) A crude oil of kinematic viscosity 0.4 stroke is flowing through a pipe of diameter 300 mm at the rate of 300 litres per sec. Find the head lost due to friction for a length of 50m of the pipe.

(OR)

- Q6.** a) Why is it necessary to control the growth of boundary layer on most of the bodies? What methods are used for such a control?
- b) A flat plate  $1.5 \text{ m} \times 1.5 \text{ m}$  moves at  $50 \text{ km/hour}$  in stationary air of density  $1.15 \text{ kg/m}^3$ . If the co-efficient of drag and lift are 0.15 and 0.75 respectively, determine
- The lift force
  - the drag force
  - The resultant force and,
  - The power required to keep the plate in motion

- Q7.** a) differentiate between the impulse & reaction turbine  
b) A jet of water from a nozzle is deflected through  $60^\circ$  from its original direction by a curved plate which it enters tangentially without shock with a velocity of 30 m/s and leaves with a mean velocity of 25 m/s. If the discharge from the nozzle is 0.8 kg/s, calculate the magnitude and direction of the resultant force on the vane, if the vane is stationary.

(OR)

- Q8.** a) With the help of neat diagram explain the construction and working of a Pelton wheel turbine  
b) A reaction turbine works at 450 r.p.m. under a head of 120 m. Its diameter at inlet is 1.2 m and the flow area is  $0.4\text{m}^2$ . The angles made by absolute and relative velocities at inlet are  $20^\circ$  and  $60^\circ$  respectively with the tangential velocity Determine:  
i) The volume flow rate, ii) The power developed and iii) The hydraulic efficiency

- Q9.** a) Define a centrifugal pump Explain the working of a single-stage centrifugal pump with sketches.  
b) A centrifugal pump is to discharge  $0.118\text{ m}^3/\text{s}$  at a speed of 1450 r.p.m. against a head of 25m. The impeller diameter is 250mm, its width at outlet is 50 mm and manometric efficiency is 75 percent. Determine the vane angle at the outer periphery of the impeller.

(OR)

- Q10.** a) What is negative slip in a reciprocating pump? Explain with neat sketches the function of air vessels in a reciprocating pump.  
b) A double –acting reciprocating pump, running at 40 r p. m., is discharging  $1.0\text{ m}^3$  of water per minute. The pump has a stroke of 400 mm. The diameter of the piston is 200 mm. The delivery and suction head are 20m and 5m respectively. Find the slip of the pump and power required to drive the pump.



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**II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018**Subject: Extraction of Mineral Deposits

Branch: MINING

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following**

5x1Mark=5 Marks

1. Define ore?
2. What is explosive?
3. What is prop density?
4. What is adit?
5. Define thawing.

**II. Answer ALL questions of the following**

10x2Mark=20 Marks

1. Discuss the distribution of coal deposits in Telangana state.
2. Write any two differences between underground mining and opencast mining.
3. Define drillability?
4. List out different accessories used in blasting.
5. What are the objectives of supporting?
6. What are the materials used for supports?
7. Differentiate cyclic and continuous system of mining.
8. What is the purpose of lining in a shaft?
9. What are the conditions that favor deepening of shaft?
10. What is the objective of cementation method?

**PART-B****Answer ALL questions of the following**

5x10 Marks= 50Marks

1. "Mining is a basic industry"- Explain.

OR

2. Explain the stages in life of a mine.
3. Explain briefly the types of drilling in mines.

OR

4. Discuss the properties that are to be considered for selection of an explosive.
5. Discuss the system of supporting when a heavy roof fall occurs at a junction.

OR

6. What is the principle of roof bolting? Write a note on roof bolting.
7. Describe the cycle of operations of driving a gallery in coal.

OR

8. What are the parameters to be considered for locating a site for inclines? Explain briefly the construction of an incline.
9. Explain the method of freezing and its application.

OR

10. Write a short note on

- a) Widening of shaft
- b) Modern techniques of shaft sinking.



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**II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018**Subject: Environmental Studies

Branch: Common to CSE (MR13) &amp; MINING (MR14)

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following**

5x1Mark=5 Marks

1. Define cybernetics.
2. What is meant by Genetic discovery?
3. Define BOD
4. What is meant by order grazing.
5. What is meant by crazy consumerism?

**II. Answer ALL questions of the following**

10x2Mark=20 Marks

1. Explain the significance of biomagnification in food chains.
2. Discuss the role of decomposers in an ecosystem.
3. Discuss the role of humans on landslide occurrence.
4. Write the differences between Species, Habitat, Genetic bio diversity
5. Enumerate the benefits of CETP.
6. Describe controlling measures of auto mobile pollution.
7. Write a brief note on rain water harvesting
8. What is the significance of greenbelt development?
9. Discuss the basic characterization of Green building.
10. Discuss about Clean Development Mechanism (CDM)?

**PART-B****Answer ALL questions of the following**

5x10 Marks= 50Marks

1. Explain energy flow in an ecosystem. Write a note on energy flow models with the help of diagrams.

OR

2. What are biogeochemical cycles? Explain the Carbon cycle with the help of neat diagram.
3. a) Define biodiversity. Describe various conservation measures for biodiversity  
b) What are hotspots of biodiversity? Discuss silent features of hotspots found in India.

OR

4. Solar energy is leading alternative energy source. Explain in detail.
5. Define air pollution. Discuss causes effects and explain various approaches for controlling air pollution.

OR

6. Explain the construction and working of nuclear power plant with a neat diagram.
7. What is Environmental impact assessment? Explain the methodology of EIA.

OR

8. Write the importance of International conventions / Protocols and explain various types of conventions?
  9. Explain the concept of sustainable development. Give an account on Threats to Sustainability.
- OR.
10. Discuss the objectives of national environmental policy and various strategies to achieve the same.





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Gundlupochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018**Subject: Probability and Statistics

Branch: Common to ME, CSE, MINING &amp; IT

Time: 3 hours

Max. Marks: 75

**PART – A****I. Answer ALL questions of the following****5x1Mark=5 Marks**

1. Define Variance of continuous probability distribution
2. Define Regression Coefficients.
3. Define one-tailed and two-tailed tests
4. What is queue discipline?
5. What is transition probability?

**II. Answer ALL questions of the following****10x2Mark=20 Marks**

1. Derive mean of Binomial distribution.
2. Average number of accidents on any day on a national highway is 1.8. Determine the probability that the number of accidents are i) at least one ii) at most one
3. Define Correlation. Classify the types of correlation.
4. Is the data, regression coefficient Y on X is 0.7 and that of X on Y is 3.2 correct? If not justify your answer.
5. What do you mean by critical region and acceptance region?
6. What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence.
7. Explain about types of customer behavior in queueing process.
8. Write the relations between  $L_s$ ,  $W_q$  in (M/M/1) : (N/FIFO) model..

9. Consider markov chain
- $$\begin{bmatrix} \frac{3}{4} & \frac{1}{4} & 0 \\ \frac{1}{4} & \frac{1}{2} & \frac{1}{4} \\ 0 & \frac{3}{4} & \frac{1}{4} \end{bmatrix}$$

10. Find the periodic and a periodic states in the transition probability matrix
- $$\begin{bmatrix} \frac{1}{2} & \frac{3}{4} \\ \frac{1}{4} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$$

## PART-B

Answer ALL questions of the following

5x10 Marks= 50Marks

1. Using recurrence relation between the probabilities find the probabilities when  $x=0, 1, 2, 3, 4$  and 5 if the mean of the Poisson distribution is 3.

OR

2. Given that  $P(X=2) = 45 P(X=6) - 3 P(X=4)$  for Poisson variate  $X$ , find the probability that  
 a)  $X \leq 2$ ,      b)  $X \geq 3$ ,      c)  $3 < X \leq 5$  and  
 d) Verify whether mean and variance of the Poisson distributions are equal.

3. Three judges A, B and C gave the following ranks. Find which pair of judges has common approach

A	1	6	5	10	3	2	4	9	7	8
B	3	5	8	4	7	10	2	1	6	9
C	6	4	9	8	1	2	3	10	5	7

OR

4. Heights of fathers and sons are given in the inches:

Height of father	65	66	67	67	68	69	71	73
Height of son	67	68	64	68	72	70	69	70

Form the two lines of regression and calculate expected average height of the son when the height of the father is 67.5 inches.

5. A coin was tossed 400 times and returned heads 216 times. Test the hypothesis that the coin is unbiased. Use 0.05 level of significance.

OR

6. A group of 5 patients treated with medicine A weight 42, 39, 48, 60 and 41 kgs. Second group of 7 patients from the same hospital treated with medicine B weight 38, 42, 56, 64, 68, 69 and 62 kgs. Do you agree with the claim that medicine B increases the weight significantly?

7. Cars arrive in pollution testing centre according to Poisson distribution at an average rate of 15 cars per hour. The testing centre can accommodate at maximum 15 cars. The service time per car is an exponential distribution with mean rate 10 per hr.

- a) Find the effective arrival rate at the pollution testing centre. [3M]  
 b) What is the probability that an arriving car has not to wait for testing. [3M]  
 c) What is the probability that an arriving car will find a vacant place in the testing centre. [3M]  
 d) What is the expected waiting time until a car is left from the testing centre. [2M]

OR

8. Cars arrive at a petrol pump with exponential interval times having mean half minute. The attendant takes an average of  $\frac{1}{5}$  minute per car to supply petrol, the service time being exponentially distributed. Find (a) The average number of cars waiting to be served. (b) The average number of cars in the system. (c) The proportion of time for which the pump attendant is idle.

9. a) Define stochastic Process, Markov Process and give examples?  
 b) Define Poisson Process and what are the postulates of Poisson Process.

OR

10. A gambler has Rs2. He bets Rs1 at a time and wins Rs1 with the probability  $1/2$ . He stops playing if loses Rs 2 or wins Rs 4. (a) What the tmp of the related markov chain? (b) What is the probability that he has lost his money at the end of 5 plays? (c) What is the probability that the game lasts more than 7 days?