Code No.: **50315**

MR15-2016-17 Batch

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 II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Fluid Mechanics and Hydraulic Machines**

Branch: **ME**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Explain Newton's law of viscosity?
2. Write down assumptions made to derive the Bernoulli's equation.
3. Write down Darcy formula and chezys formula
4. Derive the force exerted by a jet of water having velocity V on a vertical plate moving with velocity U.
5. What do you mean by NPSH in Centrifugal Pumps?

PART-B

Answer any FIVE Questions of the following **5x10 Marks= 50Marks**

1. a) A pipe contains an oil of specific gravity 0.8. A differential manometer connected at the two points A and B shows a difference in mercury level as 15 cm. find the difference of pressure at the two points.
   b) Determine the intensity of shear stress of an oil having viscosity = 1 poise. The oil is used for lubricating the clearance between a shaft of diameter 10 cm and its journal bearing. The clearance is 1.5 mm and shaft rotates at 150 rpm.

2. a) Calculate the specific weight, density, specific gravity of 11t of liquid which weights 7N.
   b) The capillary rise in the glass tube is not exceed 0.2 mm of water. Determine its minimum size, given that surface tension for water is in contact with air = 0.0725 N/m.

3. a) 250 liters/sec. of water is flowing in a pipe having diameter of 300 mm. If the pipe is bent by 135° find the magnitude and direction of the resultant forces on the bend. The pressure of the water flowing is 400 kN/m^2.
   b) A pitot tube is inserted in a pipe of 300mm diameter a static pressure in pipe is 100mm of mercury (vaccume). The stagnation pressure at center of pipe recorded by pivot tube is $0.981N/cm^2$. Calculate the rate of flow through pipe. If the mean velocity of flow is 0.85times the central velocity. Take C_v=0.98

4. a) A 60° reducing bend is connected in a pipe line, the diameter at inlet and outlet of the bend being 50 cm and 25 cm respectively. Find the force exerted by the water on the bend if the intensity of pressure at inlet of the bend is 200 kN/m^2.The rate of flow is $1m^3/s$.
   b) State classifications of flows and give suitable examples for each case.

5. a) What do you mean by "equivalent pipe" and "flow through parallel pipes"?
   b) Find the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $(u/U) = 2(y/\delta)-(y/\delta)^2$.

6. a) Derive an expression for Dupuits Equation.
   b) With the aid of neat sketches, explain the concept of boundary layer theory across a flat plate.

7. A water jet with a velocity of 40 m/s strikes a blade moving with a velocity of 20 m/s. The jet makes an angle of 30^0 with the direction of motion of the blade at inlet and leaves at an angle of 90^0 to the direction of motion of the blade at outlet. Find out the blade angled at inlet and outlet, so that the water enters and leaves the blade without shock.

8. a) Draw and explain the operating characteristics curves of centrifugal pump?
   b) Find the numbers of pumps required to take water from a deep well under a total head of 89 m. All the pumps are identical and are running at 800rpm. The specific speed of each pump is given as 25 while the rated capacity of each pump is 0.016 m^3 / sec?

Code No.: 50312

MR15-2016-17 Batch

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Dynamics of Machines**

Branch: **ME**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2M=10 Marks**

1. A motor cyclist is traveling on an uphill road and taking a turn to the right, with proper explanation give the influence of the reactive gyroscopic couple. Assume that the engine parts rotate in the same sense as of the road wheels.
2. State the conditions for the static Equilibrium of the body subjected to a system of three forces
3. Distinguish between brakes and dynamometers.
4. What is Transmissibility? How is it related to damping factor?
5. What is Sensitiveness in governors?

PART – B

Answer any FIVE questions of the following **5x10M=50 Marks**

1. a) Discuss the effect of the gyroscopic couple on a two wheeled vehicle when taking a turn.
   b) Explain the effect of the gyroscopic couple on the reaction of the four wheels of a vehicle negotiating a curve.
2. Derive all the necessary expressions for solving the following problem. A trolley car with a total mass of 3000 kg runs on rails at 1676 mm apart with a speed of 36 kmph. The track is curved with a radius of 50 m towards the right of the driver. The car has four wheels each of diameter 1 m and the total moment of inertia of the axels and wheels is 40 kg.m^2. The trolley is driven by a motor that runs at double the speed of the wheels in the direction opposite to the wheels. The motor and gears have a moment of inertia of 12 kg.m^2. Determine the vertical reaction offered by the rails on each of the wheels.
3. Synthesize a four-bar mechanism to generate a function $y = \sin(x)$ for all $0 \le x \le 90^0$ for the input range of $\Delta\phi = 120^0$ and output range of $\Delta\psi = 90^0$ for three precision points. Use Freudenstein's Equation to determine the values of all the links.
4. Synthesize a four bar function generator to solve the equation $y = 1/x$; $1 \le x \le 2$. Use three precision points and Chebyshev spacing. plot a curve of the desired function and a curve of the actual function which the linkage generates. compute the maximum error between them in percent. Take $\Delta\phi = 90°$, $\Delta\psi = 90°$, $\psi_o = 45°$ and $\phi_o = 90°$.

5. A shaft fitted with a fly wheel rotates at 250rpm and drives a machine the torque of machine varies in a cyclic manner over a period of 3 revolutions. The torque raises from 750 N-m to 3000 N-m uniformly during ½ revolution and remains constant for the following revolution. If then fall uniformly to 750N-m during the next ½ revolution and remains constant for one revolution. The cycle being repeated thereafter. Determine the power required to drive the machine and % of Fluctuation of speed, if the driving torque appliedto shaft is constant and the mass of the fly wheel is 500kg with radius of gyration is 600mm.
6. a) A torsion dynamometer is fitted on a turbine shaft to measure the angle of twist. It is observed that the shaft twists 1.5° in a length of 3metres at 600 r.p.m. The shaft is solid and has a diameter of 200 mm. The modulus of rigidity for the shaft material is 85GPa, find the power transmitted by the turbine.

   b) Write about Centrifugal Clutches
7. a) In a spring mass damper system the mass completes 5 oscillations in 2 seconds. During these 5 oscillations the amplitude decays to 10% of the initial value. The mass is 1 kg. Determine the spring constant and damping constant.

   b) Four masses *A*, *B*, *C* and *D* revolve at equal radii and are equally spaced along a shaft. The mass *B* is 10 kg and the radii of *C* and *D* make angles of 90° and 240° respectively with the radius of *B*. Find the magnitude of the masses *A*, *C* and *D* and the angular position of *A* so that the system is in complete dynamic balance.
8. In an engine governor of the Porter type, the upper and lower arms are 200mm and 250 mm respectively and pivoted on the axis of rotation. The mass of the central load is 15 kg, the mass of each ball is 2 kg and friction of the sleeve together with the resistance of the operating gear is equal to a load of 25 N at the sleeve. If the limiting inclinations of the upper arms to the vertical are 30° and 40° find, taking friction into account, range of speed of the governor.

Code No.: 50B09 | MR15-2016-17 Batch

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Probability & Statistics**

Branch: **Common to CE, ME & MINING**

Time: 3 hours **Max. Marks: 60**

PART-A

Answer ALL questions of the following **5 x 2 M=10 M**

1. Define Random Experiment and Event.
2. Define distribution function and its properties.
3. Define parameter and statistic.
4. Describe the small sample test of significance of mean.
5. Define Karl Pearson's coefficient of correlation.

PART-B

Answer any FIVE questions of the following **5 x 10 M=50 M**

1. A man and his wife appear in an interview for two vacancies in the same post. The probability of husband's selection is (1/7) and the probability of wife's selection is (1/5). What is the probability that only one of them is selected?

2. The students in a class are selected at random one after the other for an examination. Find the probability that the boys and girls sit alternately if there are (i) 5 boys and 4 girls (ii) 4 boys and 4 girls.

3. If X is a Poisson Variate such that $P(X = 3) = 3P(X = 1)/2$. Then find i) $P(X > 1)$ ii) $P(X < 4)$ iii) $P(2 < X < 5)$

4. a) The probability that john hits a target is ½. He fires 6 times .Find the probability that he hits the target exactly 2 times.
   b) Fit a Poisson distribution to the following data.

x	0	1	2	3	4	5
y	125	95	49	20	8	3

5. Suppose a car company wishes to compare the performance of its two factories producing an identical model of car. The factories are equipped with the same machinery but their outputs might differ due to managerial ability, labour relations, etc. Senior management wishes to know if there is any difference between the two factories. Output is monitored for 30 days, chosen at random, with the following results:

	Factory A	Factory B
Average daily output	420	408
Standard deviation of daily output	25	20

Does this produce sufficient evidence of a real difference between the factories, or does the difference between the samples simply reflect random differences such as minor breakdowns of machinery?

6. A manufacturer of electronic component subjects samples of two competing brands of transistors to an accelerated performance test. If 45 out of 180 transistors of the first kind and 34 of 120 transistors of the second kind fail the test, what can we conclude at 5% L.O.S about the difference between the corresponding sample proportions?

7. a) A population of heights has a $\mu=68$. What is the probability of selecting a sample of size $n=25$ that has a mean of 70 or greater and a standard deviation=4?
   b) A random sample of size 25 from a Normal population has the mean 47.5 and S.D 8.4. Does this information support the claim that the mean of the population is 42.1?

8. a) Define correlation coefficient and state its important properties.
   b) A sales manager collected the following data on annual sales and years of experience.

Salesperson	1	2	3	4	5	6
Experience (years)	1	3	4	4	6	8
Annual Sales ($1000s)	80	97	92	10	10	11

   Fit a regression model to the above data and forecast sales for a person with 10 years of experience in sales.

Code No.: **50313** | **MR15-2016-17 Batch**

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II B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Thermal Engineering – I**

Branch: **ME**

Time: 3 hours **Max. Marks: 60**

PART-A

Answer ALL Questions of the following **5x2M=10M**

1. Why the actual cycle efficiency is much lower than the air standard cycle efficiency? List the major losses in the actual engine.
2. What is called Pre ignition and list the various effects of Pre ignition.
3. List the various methods available for finding Friction power of an engine.
4. What is the effect of clearance volume on the compressor performance?
5. What are the main parts of the centrifugal compressor?

PART-B

Answer any FIVE Questions of the following **5x10M=50M**

1. a) Explain the working principle of four stroke I C Engines along with the valve timing diagram.
   b) Differentiate between two-stroke engine and four-stroke engine and explain their advantages and limitations.

2. a) Write short notes on Difference between Otto, Diesel and Dual cycles.
   b) Write short notes on Comparison of SI and CI engine.

3. a) Write short notes on Anti knock additives .
   b) Write short notes on Octane rating of fuel.

4. a) Explain the influence of turbulence and speed on delay period in C.I. Engine combustion.
   b) What is ignition quality of fuel and explain the different ways of indicating the ignition quality of fuel.

5. In a full load on oil engine, the following results were obtained
   IP = 30 KW, BP = 24 KW, Fuel consumption=0.128kg/min
   Cylinder circulating water = 5.9 kg/min
   Temperature rise of cooling water = 49.5 ^{o}c
   Temperature of Exhaust gas = 387.8 ^{o}c
   Temperature of engine room= 18.4 ^{o}c
   Air to fuel ratio = 20
   Calorific valve of oil = 45200 KJ/kg
   Sp.heat of Gas = 1.05 kJ/kg k
   Sp.heat of water = 4.2 kJ/kg k
   Determine the i) mechanical and indicated thermal efficiencies and
   ii) Draw up an energy balance on the basis of KJ/min and in percentage

6. A engine develops 5.4 kW of power with its indicated thermal efficiency and mechanical efficiency of 36% and 78% respectively. Estimate the Fuel consumption of an engine, Indicated Specific fuel consumption and Brake Specific fuel consumption. Assume Calorific value of Fuel 41,100 kJ/kg.

7. a) Write short notes on Comparison between rotary and reciprocating compressor.
   b) A Single acting reciprocating compressor has a piston diameter of 200 mm and a stroke of 300mm and runs at 350 rpm air is drawn at 1.1 bar and is delivered at 8 bar. The law of compression is $PV^{1.35}$ = Constant and the clearance volume is 6% of stroke volume. Determine the mean effective pressure and power required to drive the compressor.

8. a) Write short notes on Power input factor.
   b) Draw the pressure and velocity variations across the centrifugal compressor and explain salient features.

Code No.: 50H16 | MR15-2016-17 Batch

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II B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Environmental Sciences**

Branch: **Common to CE, ME, Mining & EEE (Readmitted Student only)**

Time: 3 hours **Max. Marks: 60**

PART – A

Answer ALL questions of the following **5x2Mark=10 Marks**

1. Explain energy pyramid with help of sketch
2. What is an aquifer? Discuss its types.
3. Distinguish between point and non point sources of pollution.
4. Give the reactions involved in the formation of ozone layer
5. Write a note on Clean Development Mechanism.

PART-B

Answer any FIVE questions of the following **5x10 Marks= 50Marks**

1. a) Discuss the different types of ecological pyramids.
   b) Explain the concept of food chain and food web in ecosystems with help of examples.
2. a) Write short notes on Pound eco-system.
   b) Give a brief account on classification of ecosystems.
3. a) Explain the environmental issues related to thermal power stations.
   b) Explain the causes for droughts and floods discuss the environmental impacts of droughts and floods.
4. Explain about the use and over utilization of surface and ground water.
5. a) Write short notes on Marine pollution.
   b) Write short notes on Automobile pollution.
6. Enumerate various methods for control of air pollutants.
7. a) Discuss about ODS.
   b) Write a short note on earth summit.
8. Considering population growth trends into consideration, explain the reasons of population. Also highlight the methods adopted for controlling growth of population.

Code No.: **50314**

MR15-2016-17 Batch

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II B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Production Technology**

Branch: **ME**

Time: 3 hours **Max. Marks: 60**

PART – A

I. Answer ALL questions of the following **5x2Mark=10 Marks**

1. What are the pattern materials? Explain.
2. Differentiate MIG and TIG welding.
3. What are metal forming operations?
4. What are forging operations?
5. What are the applications of thermosetting plastics?

PART-B

Answer any FIVE Questions of the following **5x10 Marks= 50Marks**

1. a) Explain any four casting defects and its remedies.
   b) Explain the properties required for making good moulding sand.
2. List out different types of patterns used in casting. Explain sweep and gated patterns with simple sketches?
3. Explain process, advantages, limitations and applications of Gas tungsten arc welding.
4. a) What are welding defects? Explain with neat sketches.
   b) What are the different types of flames obtained in gas welding? What are the materials that can be welded with each type of flame?
5. Explain the blanking and piercing processes and also give design calculation of die and punch for these process.
6. In a rolling operation using rolls of diameter 500 mm if a 25 mm thick plate cannot be reduced to less than 20 mm in one pass, determine the coefficient of friction between the roll and the plate.
7. a) Write a short note on Impact Extrusion.
   b) Explain the process of hydrostatic extrusion? Explain its advantages and applications.
8. a) Write short notes on how plastics are classified?
   b) Explain process, advantages and limitations of blow molding process.