

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 SUPPLEMENTARY EXAMINATIONS, MAY-2018Subject: Production Technology

Branch: ME

Time: 3 hours

Max. Marks: 60

PART-A

Answer ALL Questions of the following

5x2M=10M

1. Explain the use of runner and riser.
2. What is the difference between fusion welding and pressure welding?
3. In rolling of steel, what are the differences between a bloom, a slab and billet?
4. List out the extrusion defects and its causes.
5. What is the use of plasticizers and fillers in plastics?

PART-B

Answer any FIVE Questions of the following

5x10M=50M

1. a) What are advantages and applications of casting?
b) Write short notes on sand mould making procedure.
2. a) Explain the working principle of any two mould making machines.
b) Write short notes on Blast Furnace.
3. a) How the cutting process of ferrous metal takes place in gas cutting process?
b) Explain forge welding with neat sketch.
4. a) Explain the process of Induction welding.
b) Explain the process of seam welding in resistance welding.
5. a) Why is it necessary to provide proper clearance between the punch and die in shearing operation? Give reasons.
b) Explain the process of Wire drawing with a neat sketch.
6. a) Briefly describe the spinning process. What are its applications?
b) Differentiate coining and embossing with neat sketch.
7. a) Explain the material properties of forging and extrusion process.
b) Classify the tools and dies used in forging process.
8. What are the different types of plastics? Explain the various methods for processing of plastics.

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018

Subject: Fluid Mechanics and Hydraulic Machines

Branch: ME

Time: 3 hours

Max. Marks: 60

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

5x2Mark=10 Marks

1. What is the principle of manometers, while measuring the pressure?
2. What is the difference between Stream Line and Streak Line?
3. Define momentum equation.
4. Define the specific speed of turbine.
5. Define specific speed of the pump.

PART-B**Answer any FIVE questions of the following**

5x10 Marks= 50Marks

1. a) Prove that the shear stress of a fluid is the product of velocity gradient and coefficient of viscosity
b) A piece of pipe 52.5 mm internal diameter and 150 mm long slides down a vertical shaft of 50 mm diameter with a constant speed of 0.1 m/sec. A vertical force of 14.7 N is required to pull the pipe back up the shaft at same constant speed. Calculate the approximate viscosity of oil which fills the small gap between pipe and shaft.
2. a) Explain different types of fluids with examples. (4M)
b) A Cylinder of 0.3m diameter rotates concentrically inside a fixed cylinder of 0.31m diameter. Both the cylinders are 0.3m long. Determine the viscosity of the liquid which fills the space between the cylinders if a torque of 0.98 N-m is required to maintain a speed of 60 r.p.m. (6M)
3. a) A 45° reducing bend is connected in a Pipeline, the diameters at the inlet and outlet of the bend being 400 mm and 200 mm respectively. Find the force exerted by water on the bend if the intensity of Pressure at inlet of the bend is 215.8 kN/m^2 . The rate of flow of water is 0.5 m^3 .
b) Derive Euler's equation of motion. While listing out the assumptions made while deriving Bernoulli's equation, state and derive Bernoulli's equation.
4. a) Derive an equation of continuity for one dimensional flow along a stream line. (4M)
b) A bend in pipe line conveying water gradually reduces from 0.6m to 0.3m diameter and deflects the flow through an angle of 60° . At the larger end the gauge pressure is 171.675 kN/m^2 . Determine the magnitude and direction of the force exerted on the bend when there is no flow. (6M)

5. a) Derive the Darcy- Weisbach equation.
b) Experiments were conducted in a wind tunnel with a wind speed of 50 km/hour on a flat plate of size 2 m long and 1 m wide. The density of air is 1.15 kg/m^3 . The co-efficients of lift and drag are 0.75 and 0.15 respectively. Determine i) lift force ii) the drag force iii) the resultant force.
6. a) Explain the i) Drag on a body ii) Co-efficient of drag and co-efficient of lift.
b) Derive an expression for pipes in series & parallel.
7. a) The details of a Pelton wheel turbine installation are given below. Find the power developed and hydraulic efficiency. Gross head = 510 m, Loss of head in penstock = 30%, Discharge through nozzle = $2.2 \text{ m}^3/\text{sec}$, Angle of deflection of jet = 165 degrees
Coefficient of velocity $C_v = 1$, Speed ratio $K_u = 0.45$.
b) Derive the expression for efficiency of draft Tube.
8. A double acting reciprocating pump, running at 45 rpm, is discharging $0.009 \text{ m}^3/\text{s}$ of water. The pump has a stroke of 40 cm. The diameter of the piston is 20 cm. The suction and delivery heads are 3 m and 14 m, respectively. Find the slip of the pump and power required to drive the pump. Neglect the effect of piston rod area.

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II B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2018Subject: **Thermal Engineering – I**

Branch: ME

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

1. What are the two basic types of internal combustion engines? What are the fundamental differences between the two?
2. Name few additives, which can minimize the knocking in S.I. Engine. What are the detrimental effects on engine cylinder by adding additives in S.I. Engine?
3. Define Brake power and Friction power.
4. Compare and differentiate among the fan, blower and compressor.
5. Compare and contrast centrifugal and axial flow compressor.

PART-B

Answer any FIVE Questions of the following

5x10 Marks= 50Marks

1. What is the function of the ignition system in a SI engine? List out and explain any one type of ignition system.
2. a) Describe with the suitable sketch the two stroke cycle spark ignition (SI) engine. How its indicator diagram differs from that of four-stroke cycle engine.
b) Explain about Time loss factor.
3. Explain in detail about the factors affecting normal combustion in S.I engines
4. a) Explain about "OCTANE" Number.
b) Compare the differences between SI and CI Engines
5. A diesel engine has a Compression ratio of 14 to 1 and the fuel supply is cut off at 0.08 of the stroke. If the mass of the fuel is 0.2685 kg/kwh, having calorific value of 43700 KJ/Kg. Determine the relative efficiency of the engine.
6. a) What type of factors are considering to calculate performance of Heat Balance sheet?
b) The following data was recorded during testing of a four stroke cycle gas engine.
Area of indicator diagram = 900 mm²; Length of indicator diagram = 70 mm; spring scale = 0.3 bar/mm; Diameter of piston = 200 mm; Length of stroke = 250 mm; Speed = 300 rpm.
Determine
 - i. Indicated mean effective pressure
 - ii. Indicated power
7. a) Write short notes on Reciprocating Compressor with a neat sketch.
b) Write short notes on Lysholm Compressor
8. An 8 stage axial flow compressor takes in air at 20°C at the rate of 180 kg/min .The pressure ratio is 6 and isentropic efficiency is 0.9.Determine the power required.

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Branch: ME

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

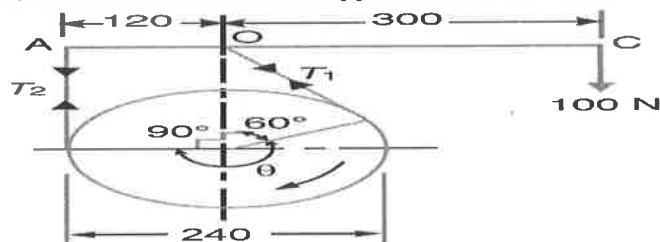
1. A car is traveling down the hill and taking a left turn. With proper explanation give the influence of reactive gyroscopic couple. Assume that the engine parts rotate in the same sense as of the road wheels.
2. State D'Alembert's principle.
3. What is the principle of a Dynamometer? What are the types of dynamometers?
4. Define free vibrations and forced vibrations.
5. Give your argument favoring or opposing the following statement regarding Porter governors. "By increasing the deadweight on the sleeve the mean operating speed can be enhanced but at the loss of sensitivity."

PART-B

Answer any FIVE Questions of the following

5x10 Marks= 50Marks

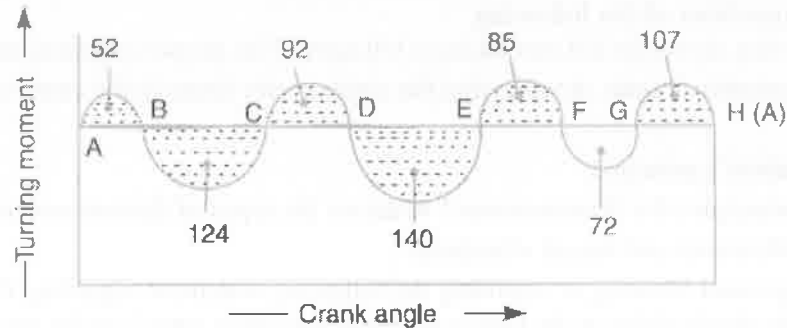
1. a) Derive the expression for the angle of heel while a motor cyclist negotiates a curved track. Use standard notation and clearly indicate all the variables and parameters used.
b) Write about Steering of a noval ship
2. The propeller shaft of an aero-engine has weight of 55 N and radius of gyration of 0.75 m. The propeller shaft rotates at 2000 rpm clockwise viewing from the tail end of aero-engine. The aircraft with aero engine makes a complete half circle of 300 m radius towards left at a speed of 300 km/hr. Find the gyroscopic couple on the aircraft and state its effect on it with reasons and related couple vectors. What will be the effect, when the aircraft turns to its right? Find the reactions on the supported bearings of propeller shaft if the distance between two bearings is 0.75m.
3. a) Sketch a slider crank mechanism of your choice and establish the dynamic equations of equilibrium for the Slider, crank and the connecting rod.
b) Explain the synthesis procedure for a four-bar function generator. What is the significance of number of precession points?
4. The simple band brake, as shown in Fig., is applied to a shaft carrying a flywheel of mass 400 kg. The radius of gyration of the flywheel is 450 mm and runs at 300 r.p.m. If the coefficient of friction is 0.2 and the brake drum diameter is 240 mm, find: (a) the torque applied due to a hand load of 100 N, (b) the number of turns of the wheel before it is brought to rest, and (c) the time required to bring it to rest, from the moment of the application of the brake.



All dimensions in 'mm'

5. The turning moment diagram for a multicylinder engine has been drawn to a scale $1\text{mm} = 600\text{ N-m}$ vertically and $1\text{mm} = 3^\circ$ horizontally. The intercepted areas between the output torque curve and the mean resistance line, taken in order from one end, are as follows:

+ 52, - 124, + 92, - 140, + 85, - 72 and + 107 mm^2 , when the engine is running at a speed of 600 r.p.m. If the total fluctuation of speed is not to exceed $\pm 1.5\%$ of the mean, find the necessary mass of the flywheel of radius 0.5 m.



6. a) Explain the principle and operation of any one transmission type dynamometer.
 b) A single cylinder, four stroke IC engine develops 20 kW at 240 rpm. The work done by the gases during the expansion stroke is 3 times the work done on the gases during the compression stroke. The work done on the suction and exhaust strokes may be neglected. If the flywheel has a mass of 1500kg and has a radius of gyration of 0.6m, Find the cyclic fluctuation of energy and the coefficient of fluctuation of speed.
7. a) Discuss how a single revolving mass is balanced by single mass revolving in same plane.
 b) A cantilever shaft 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free end. The Young's modulus for the shaft material is 200 GN/m^2 . Determine the frequency of longitudinal and transverse vibrations of the shaft.
8. a) Define the terms maximum & minimum speed and equilibrium speeds of Governors.
 b) Differentiate between governor and flywheel.

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Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 Marks

1. When a fair die is thrown, determine the probability of obtaining a prime number
2. Give examples of discrete and continuous random variables
3. Distinguish between one-sided tests and two-sided test.
4. Write any two properties of Chi-Square distribution
5. Write the equations of the regression lines of Y on X and X on Y.

PART – B

Answer any FIVE questions of the following

5x10M=50 Marks

1. a) State multiplication rule of probability for two events.
b) State addition theorem of probabilities for three events.
2. a) Write short notes on Dependent and Independent events
b) A number is selected from the first 50 natural numbers. What is the probability that it is a multiple of 5 or 11.
3. a) Calculate expectation and variance of X, if the probability distribution of the random variable.

X is given by

X	-1	0	1	2	3
Y	0.3	0.1	0.1	0.3	0.2

- b) X is a discrete random variable prove that $E(X+Y) = E(X) + E(Y)$.
4. a) The incidence of an occupational disease in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of 6 workers chosen at random, four or more will suffer from disease?
b) Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete Probability distribution (ii) Expectation (iii) Variance.
5. A random sample of 1000 men from North India shows that their mean wage is Rs 5 per day with a S.D of Rs 1.50. A sample of 1500 men from South India gives a mean wage of Rs 4.5 per day with a S.D of Rs 2. Does the mean rate of wages vary between the two regions?

6. A manufacturer claims that only 4% of his products are defective a random sample of 500 were taken among which 100 were defective .Test the hypothesis at 0.05 level.
7. In a test given to two groups of students drawn from two normal population marks obtained were as follows,

Group A : 18, 20, 36, 50, 49, 36, 34, 49, 41.

Group B : 29, 28, 26, 35, 30, 44, 46.

Examine the equality of variances at 5% level of significance.

8. Subhishi Store is a small local grocery store with only one checkout counter. Assume that shoppers arrive at the checkout lane according to a Poisson probability distribution, with an arrival rate of 15 customers per hour. The checkout service times follow an exponential probability distribution, with a service rate of 20 customers per hour. Compute:
- a) What is the probability that no customers are in the system?
 - b) What is the average number of customers that will be waiting for service?
 - c) What is the average time a customer will spend waiting for service?
 - d) What is the average number of customers in the system?
 - e) What is the average time a customer will spend in the system?