Code :9ABS401 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
PROBABILITY & STATISTICS
(Common to Civil Engineering, Mechanical Engineering, Computer Science & Systems Engineering, Information Technology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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1. (a) Define conditional event and conditional probability
   (b) Prove that if E1,E2,E3 are mutually independent events of a sample space S, then E1,E2 and E3 are also independent events.
   (c) Suppose 5 men out of 100 and 25 women out of 10,000 are color blind. A color blind person is choosen at random. What is the probability of the person being a male. Assume male and female to be in equal number?

2. (a) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number E of defective items.
   (b) The probability density f(x) of a continuous random variable is given by $f(x) = ce^{-|x|}, -\infty < x < \infty$.
   Find C, mean, variance and probability between 0 and 4.

3. (a) Find the maximum n such that the probability of getting no head in tossing a fair coin n times is greater than 0.1?
   (b) Show that poisson distribution can be derived as a limiting case of the binomial distribution.

4. (a) A normal population has a mean of 0.1 and standard deviation of 2.1. Find the probability that mean of a sample of size 900 will be negative.
   (b) The mean voltage of a battery is 15 and S.D is 0.2. Find the probability that four such batteries connected in series will have a combined voltage of 60.8 or more volts.

5. (a) In a study of an automobile insurance a random sample of 80 body repair cost had a mean of RS 472.36 and the S.D of 62.35. If $\overline{x}$ is used as a point estimate to the true average repair costs with what confidence we can asset that the maximum error doesn't exceed Rs 10?
   (b) A random sample of size 81 was taken whose variance is 20.25 and mean is 32, construct 98% confidence interval.

6. (a) 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.
   (b) A sample of 64 students has a mean weight of 70Kgs. Can this be regarded as a sample from a population with mean weight 56 Kgs and S.D 25 Kgs.

7. The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data:

Item	1	2	3	4	5	6	7	8	9	10
Life in 1000 hrs	1.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

8. (a) What are the assumptions of single channel queue?
   (b) A bank plans to open a single server drive in banking facility at a certain center. It is estimated that 20 customers will arrive each hour on average. If on average it requires 2 min to process a customer's transaction, determine.
      i. The proportion of time that the system will be idle.
      ii. On the average how long a customer will have to wait before reaching the server.
      iii. The fraction of customers who will have to wait.

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Code :9ABS401 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
PROBABILITY & STATISTICS
(Common to Civil Engineering, Mechanical Engineering, Computer Science & Systems Engineering, Information Technology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) A problem in statistics is given to 3-students A,B,C whose chance of solving it are 1/2, 3/4 and 1/4 respectively. What is the probability that the problem is solved?
   (b) State and prove Baye's theorem.
2. (a) Two Dice are thrown. Let X assign to each point (a,b) in S. The maximum of its numbers i.e X(a,b)=max(a,b). Find the probability distribution. X is a random variable with X(s)={1,2,3,4,5,6}. Also find the mean and variance of the distribution.
   (b) Find the mean and variance of the uniform probability distribution given by f(x)=1/n for x=1,2,3.....n.
3. (a) The mean of Binomial distribution is 3 and the variance is 9/4. Find (i) the value of n (ii) $p(x \geq 7)$ $(iii)p(1 \leq x < 6)$.
   (b) If X is a poisson variate such that P(x=0)=p(x=1), find P(x=0) and using recurrence formula find the probability at x=1,2,3,4 and 5.
4. (a) What is the effect on standard error, if a sample is taken from an infinite population of sample size is increased from 400 to 900.
   (b) A random sample of size 100 is taken from an infinite population having the mean μ=76 and the variance σ^2 =256, what is probability that $\overline{x}$ will be between 75 and 78.
5. (a) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with atleast 95% confidence.
   (b) A sample of 11 rats from a central population had an average blood viscosity 0f 3.92 with S.D of 0.61. Estimate the 95 % confidence limits for the mean blood viscosity of the population.
6. (a) A die is thrown 9000 times and of these 3220 yielded a 3 or 4. Is this consistent with the hypothesis that the die was unbiased?
   (b) The mean of two large samples of size 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regards as drawn from the same population of S.D 2.5 inches?
7. 4 coins were tossed 160 times and the following results were obtained.

No.of heads	0	1	2	3	4
Observed frequencies	17	52	54	21	6

   Under the assumption that coins are balanced, find the expected frequencies of 0,1,2,3 or 4 heads and test the goodness of fit (α=0.0.5).
8. At the election commission office, for the vote's identity card. A photographer takes passport size photo at an average rate of 24 photos per hour. The photographer must wait until the voter blinks or scouds, so the time to take a photo is exponentially distributed. Customers arrive at poisson distributed average rate of 20 voters per hour. Find
   (a) What is the utilization of photographer?
   (b) How much time, the voter has to spent at the election commission office on an average.

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Code :9ABS401 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
PROBABILITY & STATISTICS
(Common to Civil Engineering, Mechanical Engineering, Computer Science & Systems Engineering, Information Technology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) State the axioms of probability. If A and B are independent events show that (A^c,B^c),(A,B^c)and (A^c,B) are also independent.
   (b) A,B,C are aiming to shoot a balloon. A will succeed 4 times out of 5 attempts. The chance of B to shoot the balloon is 3 out of 4 and that of c is 2 out of 3. If the three aim the balloon simultaneously, then find the probability that at least two of them hit the balloon.

2. (a) If X and Y are discrete random variables and K is a constant then prove that
      i. E(X+K)=E(X)+K
      ii. E(X+Y)=E(X)+E(Y).
   (b) For the continuous probability function F(x)=Kx^2e^{-x},x≥0 find
      i. K
      ii. Mean
      iii. Variance.

3. (a) Out of 800 families with 5 children each, how many would you expect to have
   (i) 3 boys
   (ii) either 2 or 3 boys.
   (b) Find the mean and standard deviation of a normal distribution in which 7 % of items are under 35 and 89 % are under 63.

4. (a) A normal population has a mean of 0.1 and standard deviation of 2.1. Find the probability that mean of a sample of size 900 will be negative.
   (b) Calculate the probability that $\overline{x}$ will be between 75 and 78 if a random sample of size 100 is taken from an infinite population having mean μ=76 and variance σ^2=256.

5. (a) Determine 99 % confidence interval for the mean of contents of soft drink bottles if contents of 7 such soft drink bottles are 10.0, 9.8, 10.2, 9.6 ml.
   (b) Calculate μ_1, σ_1 for the posterior distribution if the random sample size is 80, $\overline{x}$=18.85, S=5.55 using S for S.D of population σ

6. (a) A manufacturer claimed that atleast 95 % of the equipment which he supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test his claim at 5 % loss.
   (b) Explain the procedure generally followed in testing of hypothesis.

7. (a) 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?
   (b) A die is thrown 264 times with following results. Show that the die is biased.

No. of appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	52

8. A fast food restaurant has one drive in window. It is estimated that cars arrive according to a poisson distribution at the rate of 2 every 5 times and that there is enough space to accommodate a line of 10 cars. Other arriving cars can wait outside this space , if necessary, It takes 15 minutes on the average to fill an order, but the service time actually varies according to an exponential distribution. Determine the following.
   (a) The probability that the facility is idle.
   (b) The expected number of customers waiting to be served.

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Code :9ABS401 4

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
PROBABILITY & STATISTICS
(Common to Civil Engineering, Mechanical Engineering, Computer Science & Systems Engineering, Information Technology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Define a finite even probable space.
   (b) A coin is tossed n times. What is the probability that the tail well present itself an odd number of times?
   (c) If A1,A2.....An are n events then prove that $p(\bigcap_{i=1}^{n} Ai) \geq \sum_{i=1}^{n} p(Ai) - (n-1)$.

2. (a) A sample of 4 items is selected at random from a box containing is items of which 5 are defective. Find the expected number E of defective items.
   (b) If x is a continuous random variable and y=ax+b, prove that E(Y)=aE(x)+b and V(Y)=a^2. V(x) where V stands for variance and a, b are constants.

3. Derive the mean, variance, mode of the binomial distribution. Also obtain the relation $p(r+1) = \frac{(n-r)p}{(r+1)q}.p(r)$.

4. Determine the expected number of random samples having their means
   (a) Between22.39 and 22.41
   (b) Greater than 22.42,
   (c) Less than 22.37,
   (d) Less than 22.38 or more than 22.41 if N=1500, n=36, No of samples N_s=300 σ=0.48, μ=22.4.

5. (a) Construct a 99% confidence interval for the true mean weight loss if 16 persons on diet control after one month had a mean weight loss of 3.42 kgs with s.d. of 0.68 kgs.
   (b) The mean mark in mathematics in common entrance that will vary from year to year. If this variation of the mean mark is expressed subjectively by a normal distribution with mean μ_0=72 and variance σ^2=5.76. What probability can we assign to the actual mean mark being some where between 71.8 and 73.4 for the next year's test.

6. (a) Experience had shown that 20% of a manufactured product is of the top quality. In one day's production of 400 articles only 50 are of top quality. Test the hypothesis at 0.05 level.
   (b) A sample of 64 students have a mean weight of 70kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and standard deviation 25 kgs.

7. On the basis of information given below about the treatment of 200 patients suffering from a ddisease, state whether the new treatment is comparatively superior to the conventional treatment.

	Favorable	Not favorable	Total
New	60	30	90
Conventional	40	70	110

8. (a) Explain the poisson process in the queuing theory.
   (b) Give an explanation on exponential distribution in queuing theory.

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Code :9ABS402 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering, Mechanical Engineering, Information Technology, Computer Science & Engineering, Aeronautical Engineering, Biotechnology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. Discuss about present environmental issues on global concern.
2. (a) Define renewable and non renewable resources.
   (b) Discuss about the energy resources.
3. (a) Discuss about the characteristic features, structure and functions of the ecosystem.
   (b) Discuss about desert eco system and forest ecosystem.
4. (a) Discuss about endemic and endangered species in India with example.
   (b) Write note on value of biodiversity.
5. Discuss causes, effects and control measures of water pollution.
6. Discuss about the:
   (a) Resettlement and rehabilitation of people.
   (b) Urban problems related to energy.
7. Discuss about the:
   (a) Population growth.
   (b) Women and child welfare.
8. Write the report on the local polluted site you have visited.

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Code :9ABS402 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering, Mechanical Engineering, Information Technology, Computer Science & Engineering, Aeronautical Engineering, Biotechnology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. Discuss about government's initiative for environmental management.
2. Discuss uses and over utilization of mineral resources.
3. (a) Discuss about food chains and food webs with examples.
   (b) Discuss about ecological pyramids.
4. Discuss about genetic biodiversity, species and ecosystem diversity.
5. Discuss in detail about the thermal pollution and its problems.
6. Discuss about the air and water prevention and control of protection act.
7. Note on:
   (a) Role of information Technology in Environment and human health.
   (b) Family welfare programs.
8. Write the field report on the grass land ecosystem.

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Code :9ABS402 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering, Mechanical Engineering, Information Technology, Computer Science & Engineering, Aeronautical Engineering, Biotechnology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. Discuss about environmental crisis and sustainable development.
2. Discuss in detail about uses and over exploitation of forest resources.
3. (a) Discuss about the Energy flow in the ecosystem.
   (b) Discuss about ecological succession.
4. Discuss in-situ and ex-situ conservation of biodiversity.
5. Write short note on noise and soil pollution.
6. Write note on:
   (a) Water shed management.
   (b) Rain water harvesting.
7. (a) Discuss about the Environment and human health.
   (b) Define Environment.
8. Discuss your observation on local agricultural polluted site you have visited.

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Code :9ABS402 4

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
ENVIRONMENTAL SCIENCE
(Common to Civil Engineering, Mechanical Engineering, Information Technology, Computer Science & Engineering, Aeronautical Engineering, Biotechnology)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. Write a detailed note on the role of any four organizations in the field of environment and their contribution to better management.
2. Discuss in detail about the:
   (a) World food problems.
   (b) Changes caused by agriculture and over grazing.
3. (a) Discuss about the Grassland ecosystem and aquatic ecosystem.
   (b) Define the ecosystem.
4. Discuss the following:
   (a) Habitat loss
   (b) Poaching of wild life
   (c) Hot spots of Biodiversity
5. Discuss causes, effects and control measures of Air pollution.
6. Write short note on:
   (a) Climate changes
   (b) Global warming
   (c) Acid rain
7. (a) Explain HIV/AIDS.
   (b) Write note on human rights and value education.
8. Write the documentation on environmental assets in your visit.

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Code :9A01404 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
FLUID MECHANICS & HYDRAULIC MACHINERY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Explain briefly the working principle of Bourdon pressure gauge with a neat sketch.
   (b) Calculate the capillary rise in a glass tube of 3.0 mm diameter when immersed vertically in (a) water and (b) mercury. Take Surface tensions for mercury and water as 0.0725 n/m and 0.52 n/m respectively in contect with our. Specific gravity for mercury in 13.6.

2. (a) State and explain Bernoulli's theorem. Mention the assumptions made. How is it modified while applying in practice.
   (b) A pipe line carrying oil of specific gravity 0.8 changes in diameter from 300 mm at a position A to 500mm diameter to a position B. which is 5m at a higher level. If the pressures at A and B are 19.62 n/Cm^2 and 14.91 n/Cm^2 respectively and the discharge is 150 lit/sec, determine the loss of head and direction of flow.

3. (a) Derive an expression for loss of head due to friction.
   (b) Two pipes of lengths 2500 m each and diameters 80 cm and 60 cm respectively are connected in parallel. The coefficient of friction for each pipe is 0.006. The total flow is equal to 250 lit/sec. Find the rate of flow in each pipe.

4. (a) For a curved radial vane, derive an expression for the work done per second.
   (b) A jet of water of the diameter 100mm moving with a velocity of 20m/sec strikes a curved fixed plate tangentially at one end at an angle of 30^0 to the horizontal. The jet leanes the plate at an angle of 20^0 to the horizontal. Find the force exerted by the jet on the plate in the horizontal and vertical directions.

5. (a) Draw a neat sketch of a hydropower plant and explain the various elements of it.
   (b) What do you mean by daily load curve. Draw the curve and explain the significance of it.

6. (a) Differentiate between:
      i. Impulse and Reaction turbines
      ii. Radial and ascial flow turbines
      iii. Inward and outward radial flow turbine.
   (b) Design a pelton wheel for a head of 80m and speed 300r.p.m. The pelton wheel develops 103 KWSP Take $C_v = 0.98$, speed Ratio = 0.48 and overall efficiency = 0.80.

7. (a) Define cavitation. What are the effects of cavitation. Give the necessary precautions against cavitation.
   (b) A pelton wheel is revolving at a speed of 200 r.p.m. and develops 5886 KWSP. When working under a head of 200 m with an overall efficiency of 80%. Determine unit speed, unit discharge and unit power. The speed ratio for the turbine is given as 0.48. Find the speed, discharge and power when this turbine is working under a head of 150m.

8. (a) Define centrifugal pump. Explain the working of a single stage Centrifugal pump with sketches.
   (b) Obtain an expression for the minimum speed for a starting a centrifugal pump.

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Code :9A01404 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
FLUID MECHANICS & HYDRAULIC MACHINERY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Differentiate between: (i) Absolute and gauge pressure (ii) simple manometer and differential manometer and (iii) piezometer and pressure gauge.
   (b) A plate, 0025 mm distant from a fixed plate moves at 50cm/sec and requires a force of 1.471 n/m^2 to maintain this speed. Determine the fluid viscosity between the plates in poise.
2. (a) Discuss the classification of flows giving suitable practical examples for each case.
   (b) A 45^0 reducing bend is connected in a pipe line, the diameters at the inlet and outlet of the bend being 40cm and 20cm respectively. Find the force exerted by water on the bend if the intensity of pressure at inlet of bend is 21.58 n/cm^2. The rate of flow of water is 500 lit/sec.
3. (a) What is a venturimeter. Derive an expression for the discharge through a venturimeter.
   (b) An oil of kinematic viscosity 0.5 stoke is flowing through a pipe of diameter 300mm at the rate of 320 lit/sec. Find the head lost due to friction for a length of 60m of the pipe.
4. (a) Differentiate between:
      i. the force exerted by a jet of water on a fixed vertical plate and moving vertical plate.
      ii. the force exerted by a jet on a single curved moving plate and a series of curved moving plate.
   (b) Show that the efficiency of a free jet striking normally on a series of flat plates mounted on the periphery of a wheel can never exceed 50%.
5. (a) What is a flow mass curve. Explain how it is used in fixing the capacity of a reservoir.
   (b) What is a Surge tank. Describe its working and function.
6. (a) What are the uses of a draft tube. Describe with neat sketches different types of draft tubes.
   (b) A Kaplan turbine runner is to the designed to develop 7357.5 KWSP. The net available head is 10m. Assume that the speed ratio is 1.8 and flow ratio 0.6 if the overall efficiency is 70% and diameter of the loss is 0.4 times the diameter of the runner, find the diameter of the runner, its speed and specific speed.
7. (a) Define the specific speed of a turbine. Derive an expression for the specific speed. What Is the significance of the specific speed.
   (b) What is cavitation? How can it be avoided in reaction turbine.
8. (a) Obtain an expression for the work done by impeller of a centrifugal pump on water per second per unit weight of water.
   (b) What is primary. Why and when it is necessary. Explain the primary devices.

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Code :9A01404 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
FLUID MECHANICS & HYDRAULIC MACHINERY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Explain the phenomenon of capillarity obtain an expression for capillary rise of a liquid.
   (b) An open tank contain water upto a depth of 1.5 m ad above it an oil of specific gravity 0.8 for a depth of 2m. Find the pressure intensity (i) at the interface of the two liquids and (ii) at the bottom of the tank.

2. (a) Define: (i) path line (ii) streak line (iii) stream line (iv) stream tube.
   (b) Define the equation of continuity. Obtain an expression for continuity equation for a one dimensional flow.

3. (a) Show that loss of head due to sudden expression in pipe line is a function of velocity head.
   (b) A 30cm x15 cm venturimeter is inserted in a vertical pipe carrying water flowing in upward direction. A differential mercury manometer connected to the inlet and throat gives a reading of 30 cm. Find the discharge . take $C_d = 0.98$.

4. (a) Derive the expression for the force exerted by a jet of water on an included fixed plate In the direction of jet.
   (b) A jet of water diameter 50 mm moving with a velocity of 20 m/sec strikes a fixed plate in such a way that the angle between the jet and the plate is 60^0. Find the force exerted by a jet on the plate (i) in the direction normal to the plate and (ii) in the direction of the jet.

5. (a) Describe various types of hydal schemes.
   (b) Write short notes on:
      i. Scroll casing
      ii. Draft tube and
      iii. Tail Race.

6. (a) Obtain an expression for the work done per second by water on the runner of a pelton wheel and hence derive expression for maximum efficiency.
   (b) Explain the principle and working of a Francis turbine with the help of a neat sketch.

7. (a) What do you understand by the characteristic curves of a turbine. Explain with a sketch.
   (b) What is water hammer. Where and how it develops. What measures are to be taken against its happening.

8. (a) Define specific speed of a centrifugal pump. Derive an expression for the same.
   (b) The diameter of an impeller of a centrifugal pump at inlet and outlet are 300 mm and 600 mm respectively. The velocity of flow at outlet is 2.5 m/sec and vanes are set back at an angle of 45^0 at outlet. Determine the minimum strating speed of the pump if the manometric efficiency is 75%.

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Code :9A01404 4

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
FLUID MECHANICS & HYDRAULIC MACHINERY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Define surface tension. Derive the relationship between surface tension and pressure inside a droplet of liquid in excess of outside pressure.
   (b) Determine the intensity of shear of an oil having viscosity of 1.2 poise and is used for lubrication in the clearance between 10cm diameter shaft and its fournal bearing. The clearance is 1.0mm and shaft rolates at 200 rpm.
2. (a) Distinguish between:
      i. Laminar and Turbulent flow
      ii. Uniform and non uniform flow and
      iii. Steady and unsteady flow
   (b) What is Eulers equation of motion, obtain Bernoullis equation from it.
3. (a) Describe major and minor losses in ripes with neat sketches.
   (b) A horizontal pipe of diameter 400 mm is suddenly contracted to a diameter of 200 mm. The pressure intensities in the large and smaller pipe is given as 14.715 N/cm^2 and 12.753 N/cm^2 respectively. If C_C=0.62, find the loss of head due to contraction. Also determine the rate of flow of water.
4. (a) Derive an expression for the force exerted by a jet of water an moving inclined plate in the direction of jet.
   (b) A jet of water of diameter 100 mm moving with a velocity of 30msec strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.
5. (a) Explain: (i) intake structure (ii) penstock (iii) Anchor block
   (b) Explain the terms load factor, plant factor and utilization factor. Derive relation between these factors.
6. (a) Define and explain different efficiencies of a turbine.
   (b) A pelton wheel has a mean bucket diameter of 0.8 m and is running at 1000 rpm. The net head on the pelton wheel is 400 m. If the side clearance angle is 15^0 and discharge through nozzle is 150 lit/sec find:
      i. Power available at the nozzle
      ii. Hydraulic efficiency of the turbine.
7. (a) What are unit quantities. Derive the expressions for unit speed, unit discharge and unit power of a turbine.
   (b) Define the term 'Governing of a turbine'. Describe with a neat sketch the working of an oil pressure governor.
8. (a) What do you mean by pump characteristics? Briefly explain the uses of such characteristics.
   (b) Describe multistage pump with
      i. impellers in parallel and
      ii. impellers in series.

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Code :9A03401 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
KINEMATICS OF MACHINERY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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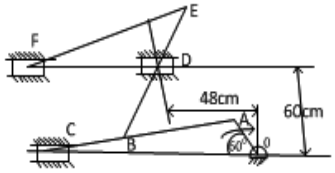
1. (a) Differentiate between:
   i. Completely constrained motion and incompletely constrained motion
   ii. Mechanism and machine.
   (b) With a neat sketch explain the inversion of double-slider crank mechanism which is used in elliptical trammel.

2. Give a neat sketch of the straight line motion Hart mechanism. Prove that it produces an exact straight line motion.

3. For the given mechanism shown in fig. determine the acceleration of the slider F and angular acceleration of link BE, when crank OA rotates clockwise at 191 r.p.m for the given configuration. OA=20 cm, AC=BE=EF=80 cm, BC=30 cm.



4. The driving shaft of a Hooke's joint runs at a uniform speed of 240 r.p.m and the angle α between the shafts is 20^0. The driven shaft with attached masses has a mass of 55 kg at a radius of gyration of 150mm.
   (a) If a steady torque of 200 N-m resists rotation of the driven shaft. Find the torque required at the driving shaft when θ=45^0.
   (b) At what value of α will the total fluctuation of the driven shaft be limited to 24 r.p.m.?

5. Draw the profile of a cam operating a knife-edge follower when the axis of the follower passes through the axis of the cam shaft from the following data:
   (a) Follower to move outwards through 30 mm during 90^0 of cam rotation.
   (b) Follower to dwell for the next 45^0,
   (c) Follower to return to its original position during next 60^0,
   (d) Follower to dwell for the rest of the cam rotation.
   The displacement of the follower is to take place with simple harmonic motion during both the outward and the return strokes. The least radius of the cam is 50 mm. if the cam rotates at 600 r.p.m. determine the maximum velocity and acceleration of the follower during outward stroke and return stroke.

6. (a) Explain the terms:
   i. module
   ii. addendum
   (b) Calculate:
   i. Length of path of contact.
   ii. Arc of contact and
   iii. the contact ratio when a pinion having 23 teeth drives a gear having teeth 57. The profile of the gears is involute with pressure angle 20^0, module 8 mm and addendum equal to one module.

7. A shaft which rotates at a constant speed of 160 r.p.m. is connected by belling to a parallel shaft 72 cm apart which has to run at 60, 80, and 100 r.p.m. the smallest pulley on the driver shaft is 4 cm in radius determine the remaining radii of the two stepped pulley for:

   (a) a crossed belt, and

   (b) an open belt.

8. In an epicyclic gear train, the internal wheels A and B and the compound wheels C and D rotate independently about axis O. the wheels E and F rotate on pins fixed to the arm G.E gear with A and C and F gear with B and D. All wheels have the same module and the number of teeth are:
   $T_C = 28, T_D = 26, T_E = T_F = 18$

   (a) Sketch the arrangement.

   (b) Find the number of teeth on A and B.

   (c) If the arm G makes 100 r.p.m. clockwise and A is fixed, find the speed B.

   (d) If the arm G makes 100 r.p.m. clockwise and wheel A makes 10 r.p.m. counter clockwise, find the speed of wheel B.

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Code :9A03401 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
KINEMATICS OF MACHINERY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain the classification of the kinematics pairs with the help of examples.
   (b) Explain the inversion of single slider crank mechanism which is used in whitworth quick return motion mechanism.

2. (a) Sketch and describe the peaucellier straight line mechanism indicating clearly the conditions under which the point P on the corners of the rhombus is capable of producing straight line.
   (b) Prove geometrically that the above mechanism is capable of producing straight line.

3. The crank of a slider crank mechanism is 15 cm and the connecting rod is 60 cm long. The crank makes 300 r.p.m in the clock wise direction. When is has turned 45 from the inner dead centre position, determine:
   (i) Acceleration of the mid-point of the connecting rod and
   (ii) angular acceleration of the connecting rod.

4. (a) What is the use of Double Hooke's joints? Explain why two Hooke's joints are used to transmit motion from the engine to the differential of an automobile.
   (b) The angle between the axes of two shafts connected by universal joint is 20^0 the driving shaft rotates at uniform speed of 240 r.p.m. The driven shaft carries a steady load of 9 k W. calculate the radius of gyration of the flywheel off the driven shaft having mass 50 kg and the output torque of the driven shaft does not vary by more than 20% of the input shaft.

5. Draw full size profile of cam which will lift a 2.5 cm diameter follower through 4 cm. The centre line of the follower passes through the centre of rotation of the cam. Ascent of follower takes place with S.H.M. in 0.1 second, followed by a period of rest of 0.025 sec. The follower then descends with uniform acceleration and retardation in 0.075 second. The cam rotates at a uniform speed of 120 r.p.m. and the least radius of the cam is 10cm also plot velocity and acceleration diagrams of the follower during one revolution of the cam and mark important values thereon.

6. (a) Define the term; length of arc of contact' and prove that it is equal to length of path of contact dividing by cosine of the pressure angle.
   (b) The number of teeth on each of the two equal spur gears in mesh is 40. The teeth have 20^0 involute profile and the module is 6 mm. if the arc of contact is 1.75 times the circular pitch, find the addendum.

7. An open-belt drive connects two pulleys 120 cm and 50cm diameter on parallel shafts 4 m apart. The belt weighs. 0.9kg/m length and maximum tension in it is not to exceed 2000 N. the co-efficient of friction is 0.3. the 120 cmpulley. Which is the driver, runs at 200 r.p.m. Due to belt slip on one of the pulleys, the velocity of the driven n shaft is only 450 r.p.m. calculate the torque on each of the two shafts, the power transmitted and power lost in friction. What is the efficiency of the drive?

8. In an epicyclic gear train an annular wheel A having 54 teeth meshes with a planes wheel B which gears with a sun wheel C, the wheels A and C being coaxial. The wheel B is carried on a pin fixed on one end of arm P which rotates about the axis of the wheels A and C. if the wheel A makes 20 r.p.m. in a clockwise sense and the arm rotates at 100 r.p.m. in the anticlockwise direction and the wheel C has 24 teeth, determine r.p.m. and sense of rotation of C.

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Code :9A03401 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
KINEMATICS OF MACHINERY
(Mechanical Engineering)

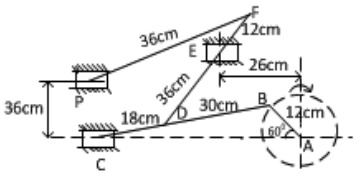
Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Define the term 'Inversion of a mechanism. Explain any one inversion of double slider crank mechanism.
   (b) In a crank and slotted lever quick return mechanism, the distance between the fixed centers is 150 mm and the driving crank is 75 mm long. Determine the ratio of the time taken of the cutting and return strokes.

2. (a) Name of different mechanisms which are used for mathematically correct straight line motion. Explain any one of them with the help of a line diagram.
   (b) Prove geometrically that the above mechanism is capable of producing straight line.

3. In a steam engine mechanism, shown in fig, the crank AB rotates at 200 r.p.m. the dimension of the various links are: AB=12 cm, BC=48 cm, CD=18 cm DE=36 cm and EF=12 can FP=36 cm, find the velocities of C,D,E,F and P.



4. (a) Prove that the ratio of the angular velocities of the driven and driving shafts for a Hooke's joint is given by $\omega_2/\omega_1 = \cos\alpha/1 - \cos^2\theta \sin^2\alpha$.
   (b) What is the condition for correct steering? Sketch and show the two main types of steering gears and discuss their relative advantages.

5. (a) Define the follower terms as applied to cam with a neat sketch.
   (i) Base circle
   (ii) Pitch circle
   (iii) Pressure angle
   (b) A cam rotates at a uniform speed of 360 r.p.m. and gives an oscillating follower, 6.5 cm long, angular displacement of 30^0 in each stroke. The follower is fitted with a roller 3cm diameter which makes contact with the cam. The outward and return displacement each takes place with equal periods of uniform acceleration and retardation, while the cam turns through 60^0 and there is a period of dwell in the outward position when the cam turns through 90^0 if the axis of the fulcrum is 8.8 cm from the axis of the cam, and the least distance of the roller axis from the cam axis is 5 cm, draw the outline of the cam. Also determine maximum angular velocity and acceleration of the follower.

6. Two mating involute spur gears of 20^0 pressure angle have a gear ratio of 2. The number of teeth on the pinion is 20 and its speed is 250 r.p.m. the module pitch of the teeth is 12mm. If the addendum on each wheel is such that the path of approach and the path of reces on each side are half the maximum possible length each, find:
   (a) the addendum for pinion and gear wheel.
   (b) the length of arc of contact.
   (c) the maximum velocity of sliding during approach and recess. Assume pinion to be driver.

7. The maximum allowable tension in a flat belt is 1500 N. the angle of lap is 170^0 and co-efficient of friction between the belt and material of the pulley is 0.27. Neglecting the effect of centrifugal tension, calculate the net driving tension and power transmitted if the belt speed is 2 m/s.

8. An epicyclic gear train consists of a sun wheel S, a stationary internal gear E and three identical planet wheels P carried on a star-shaped planet carrier C. the size of different tooth wheels are such that the planet carrier C-rotates at $1/5^{th}$ of the speed of the sun wheel S. The minimum number of teeth on any wheel is 16. The driving torque on the sun wheel is 100 N-m. determine:
   (a) number of teeth on different wheels of the train, and
   (b) torque necessary to keep the internal gear stationary.

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Code :9A03401

4

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
KINEMATICS OF MACHINERY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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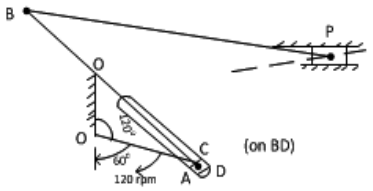
1. (a) Differentiate between:
   i. Lower pair and higher pair.
   ii. Turning pair and sliding pair.
   iii. Screw pair and spherical pair
   iv. Closed pair and unclosed pair.
   (b) With a neat sketch explain the Whitworth Quick return mechanism.
2. Draw the sketch of a mechanism in which a point traces an exact straight line. Prove that the point traces an exact straight line motion.
3. In a whitworth quick return motion mechanism as shown in fig. the various dimensions are given as: OQ=100mm, OA=200 mm, BQ=150mm , BP=500mm find the velocity of block P and the angular velocity of line BQ.



4. (a) In a Davis steering gear, the distance between the pivots of the front axle is I metre and the wheel base is 2.5 m. find the inclination of the track arm to the longitudinal axis of the car, when it is moving along a straight path.
   (b) Two shafts are connected by a Hooke's joint. The driving shafts revolves uniformly at 500 r.p.m. if the total permissible variation on speed of the driven shaft is not to exceed +-6% of the speed, find the greatest permissible angle between the centre lines of the shafts. Also determine the maximum and minimum speeds of the driven shaft.
5. (a) Define and explain the terms: cam profile, base circle, prime circle, pitch curve, lift and period of dwell.
   (b) Draw the displacement velocity and acceleration diagrams for a follower when it moves with uniform acceleration and uniform retardation.
   Derive an expression for velocity and acceleration during outstroke and return stroke of the follower.
6. (a) Find an expression for the length of the path of contact between two mating spur gears.
   (b) Two mating involute spur gears have 28 and 45 teeth and a standard addendum of one module. Find the length of path of contact and length of arc of contact in terms of module when pressure angle is 20^0.
7. (a) Derive an expression for the length of a crossed belt.
   (b) The maximum permissible stress in a belt is 1.4 N/mm2 and ratio of tensions is 2.0 find the maximum power transmitted by a belt 150 mm x 10 mm if the density of leather is 1 Mg/m3.
8. Two shafts A and B are coaxial . A gear C (50 teeth) is rigidly mounted on shaft A. A compound gear D-E gear with C and an internal gear G. D has 20 teeth and gears with C and E has 35 teeth and gear with an internal gear G. Is fixed and is concentric with the shaft axis. The compound gear D-E is mounted on a pin which projects from an arm keyed to the shaft B.
   (a) Sketch the arrangement
   (b) Find the number of teeth on internal gear G assuming that all gears have the same module.
   (c) If shaft A rotates at 110 r.p.m find the speed of shaft B.

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Code :9A03402 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
THERMAL ENGINEERING-I
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Define volumetric efficiency and discuss the effect of various factors affecting the volumetric efficiency.
   (b) How does the composition of exhaust gases vary for various fuel-air ratios in a gasoline engine?
2. (a) Draw a typical value timing diagram for a four stroke diesel engine and explain the significance of value over lap.
   (b) Compare between Air - standard cycles and Fuel-air cycles.
3. (a) What is meant by abnormal combustion? Explain the phenomena of knock in s1 engines.
   (b) What are homogeneous and heterogeneous mixtures? In which engines these mixtures are used? Explain.
4. Explain with figure various types of combustion chambers used in c1 engines.
5. (a) Explain the method of motoring test for obtaining friction power of an engine.
   (b) Find the air - fuel ratio of a four- stroke, single cylinder, air coded engine with fuel consumption time for 10cc is 20.4s and air consumption time for $0.1m^3$ is 16.35. The load is 17Kg at the speed of 3000rpm . Find also brake specific fuel. Consumption in g/KWh and brake thermal efficiency. Assume the density of air as 1.175 Kg/m^3 and specific gravity of fuel to be 0.7. The lower heating value of fuel is 43 MT/kg and the dynamometer constant is 5000.
6. Explain the effect of excessive clearance on the performance of air compressor. A single acting two stage reciprocating air compressor running at 280 rev/min delivers air at a pressure of 18 bar, the conditions at the commencement of compression being $0.^{0}98$ bar and 305K. The intermediate pressure is 4 bar and the clearance volume for low pressure cylinder is 5% of its swept volume. Equation of compressor has a capacity of 2.25 m^3/minute measured under free conditions of 1 bar and 290 k. Design the compressor for (a) volumetric efficiency (b) theoretical work spent in driving the compressor (c) dimensions of L.P. cylinder 1f bore is equal to stroke (d) isothermal efficiency, The gives compressor has a perfect intercooling.
7. (a) Write a brief note on Rotary displacement compressors and derive an expression for the efficiency of Roots blower.
   (b) Explain the terms serging & choking of a compressors.
8. (a) Explain the working of an axial flow compressor.
   (b) Explain the term degree of reaction and point on the difference between the blading of a reaction turbine and that of axial flow compressor.

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Code :9A03402 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
THERMAL ENGINEERING-I
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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1. (a) Briefly explain the following : (i) time loss factor (ii) heat loss factor (iii) exhaust blow down factor.
   (b) Compare the actual and fuel - air cycles of a Diesel engine.

2. (a) List various assumptions made in air - standard cycle analysis and explain how the actual cycles are different form air standard cycle.
   (b) Explain how the power and efficiency of the S1 engine vary with air - fuel ratio for different load and speed conditions.

3. (a) Explain the effect of various engine variable on S1 engine knock.
   (b) Explain the various factors that influence the flame speed in S1 engines.

4. (a) Explain the phenomenon of knock in C1 engines and compare it with S1 engine knock.
   (b) What are homogeneous and heterogeneous mixtures? In which engines these mixtures are used? Explain.

5. (a) With a neat sketch explain an Eddy current dynamometer.
   (b) A six - cylinder, gasoline engine operators on the four - stroke cycle. The bore of each cylinder is 80mm and the stroke 100mm. The clearance volume per cylinder is 70cc. At a speed of 4000rpm the fuel consumption is 20 Kg/h and the torgue developed is 150 Nm. Calculate
      i. the brake power
      ii. the brake mean effective pressure
      iii. brake thermal efficiency is the calorific value of the fuel is 43000 KJ/Kg and
      iv. the relative efficiency on a brake power basis assuming the engine works on the constant volume cycle. $\gamma = 1.4$ for air.

6. An air Compressor designed to deliver air at 8 bar a stroke length 80cm and the clearance volume is 2% of the swept volume. To study the effect of clearance on free air delivery at work expanded. The compressor was overhauled and a distance piece of 0.5cm was filled between the cylinder head and the cylinder. The compressor was then commisined under the changed clearance. Calculate percentage change in the volume of free air delivered and the power necessary to run the compressor.

7. (a) Explain the performance characteristics of Rotary compressors.
   (b) Give a detailed classification of Rotary compressors.

8. A multi stage axial floe compressor absorbs H.P when delivering 20 Kg/sec of air from stagnation condition of I bar and 288 K. If the poly tropic efficiency of compression is 0.9 and if the stage stagnation pressure ratio is constant, calculate
   (a) pressure at compressor out let
   (b) the number stager and
   (c) over all isentropic efficiency of compressor.

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Code :9A03402 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
THERMAL ENGINEERING-I
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks
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1. (a) Discuss the effect of spark advance on the performance of an otto cycle engine. What is meant by the optimum spark advance?
   (b) Briefly discuss pumping and rubbing Friction losses. Discuss briefly the loss due to gas exchange process.
2. (a) With a neat sketch explain the working principal of a simple carburetor.
   (b) Explain various Factors which effect the ignition timing.
3. (a) Briefly explain the stages of combustion in S1 engines elaborating the flame front propagation.
   (b) What are homogeneous and heterogeneous mixtures? In which engines mixtures are used Explain.
4. (a) What is delay period and what are the factors that effect the delay period?
   (b) Explain the phenomena of knock in C1 engines?
5. (a) Explain the internationally accepted methods of measuring the following invisible emission.
   (i) oxides of nitrogen
   (ii) carbon monoxide
   (b) The following details were noted in a test on a four - cylinder, four - stroke engine, diameter = 100mm; stroke = 120mm; speed of the engine = 1600 rpm; fuek consumption = 0.2 Kg/min; calorific value of fuel is 44000 KJ/Kg; difference in tension on either side of the brake pulley = 40 Kg; brake circumference is 300cm. If the mechanical efficiency is 80% calculate
      i. brake thermal efficiency
      ii. indicated thermal efficiency
      iii. indicated mean effective pressure and
      iv. brake specific fuel consumption.
6. A single cylinder reciprocating air compressor running at 150rpm delivers to a receiver $5m^3$ of free air per minute. Compressed to a pressure of 6 Kgf/cm^2. The suction is at 1 Kgf/cm^2 and 300k. Compression and expension. Curve follows the law $pv^{1.3}$=c. Clearance is 5% of the active stroke. Estimate.
   (a) Temperature of air as admitted to receiver.
   (b) Volumetric efficiency
   (c) Volumetric of air taken in per stroke
   (d) Dimension of the cylinder if stroke equals 1.25 times diameter.
   (e) H.p of compressor.
7. A Rotary vane compressor has a free air delivery of 0.03 m^3/revolution when it compressor from 1 bar to 1-5 bar. Estimate the work expended for revolution in driving the compressor when (a) ports are S0 placed that there is no internal compression (b) The ports so placed that there is 50% pressure rise due to internal adiabatic compression before have flow occurring also determine the blower efficiency.
8. An axial compressor has a degree of reaction of 0.5 at the mean radius with relative air angles of 130^0 and 100^0 at rotor inlet and outlet respectively. The angles are measured in the same direction from the blade velocity direction. The over all stagnation pressure ratio is 3.5 and the stagnation isentropic efficiency is 85% when the inlet stagnation temperature is 330^0k. The blade speed is constant at 200 m/s and the flow velocity is also constant in the compressor. The work done factor is 0.85. Find the stagnation polytropic efficiency and the number of stages.

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Code :9A03402 4

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
THERMAL ENGINEERING-I
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Why the actual cycle efficiency is much lower than the air standard cycle efficiency? List the major losses and differences in actual engine and air standard cycles.
   (b) Discuss the optimum opening position of exhaust value to reduce the exhaust blowdown loss.

2. (a) Enumerate various components of an electronic fuel in system and mention their functions.
   (b) Distinguish between wet sump and dry sump lubrication systems.

3. What are the various types of combustion chambers used in S1 engines? Explain them briefly.

4. Bring out clearly the process of combustion in C1 engines and also explain the various stages of combustion.

5. (a) State the limitations experienced in the evaluation of friction power using Willan's line method.
   (b) A four - stroke gas engine having a cylinder of 250mm diameter and stroke 450mm has a volumetric efficiency of 80%, ratio of air to gas is 8 to 1, calorific value of gas is 20 MJ/m^3 at NTP. Find the heat supplied to the engine per working cycle. If the compression ratio is 5, What is the heating value of the mixture per working stroke per m^3 of total cylinder volume?

6. Discuss concisely the reason for the use of multistage reciprocating compressors. Explain the underlying principle by means. Of a P-V and T-S diagram,
   It is required to compress 1m^3 of air/s from 0.98 bar and 20^0C to a delivery pressure of 60 bar. The compression of air follows the polytropic law $PV^{1.25}$= c. Estimate theoretical power required when compression is carried out in (a) Single stage compressor (c) Three stage compressor. Also estimate the temperature of air at the end of compression in each case. Neglect clearance and assume ideal conditions regarding intercooling . Comment on the results.

7. (a) Explain the working of centrifugal compressor.
   (b) Explain the terms serging & choking of a compressor.

8. An eight stage axial flow compressor provides an over all pressure ratio of 6:1 with an overall isentropic efficiency 90% when the temperature of air at inlet is 20^0. The work is divided equally between stages. A 50% reaction design is used with a mean blade speed 188m/s and a constant axial velocity 100m/s through the compressor ultimate the power required and blade angles. Assume air to be a perfect gas for which C_p=$0^0$24, $\gamma = 1^0$4.

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Code :9A03403 **1**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
MANUFACTURING TECHNOLOGY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Sketch and explain different types of patterns used in foundary.
   (b) What are master patterms? How does their size from other patterns? Explain.
2. (a) Why are risers used on the moulds.
   (b) How many types of risers do you know? Describe.
   (c) What are the advantages of blind riser over conventional type riser?
3. (a) What is heat affected zone? State its characteristics.
   (b) Explain with neat sketches of a resistance welding process.
4. Explain the following:
   (a) Friction welding
   (b) Explosive welding
   (c) Induction welding.
5. (a) Define the following terms:
      i. Recovery
      ii. Recrystalization
      iii. Grain growth
   (b) Classify the various rolling mills. Sketch and explain the principle involved in each rolling rill.
6. Write short notes on:
   (a) Coining.
   (b) Cold bending
   (c) Cold spinning
   (d) Hot drawing.
7. (a) What is extrusim? Describe common methods of extrusims with neat sketches.
   (b) Explain rotary forging with neat sketches.
8. (a) What is the principles of electro discharging machine? Explain with neat sketch.
   (b) Explain the concepts of rapid manufacturing.

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Code :9A03403 **2**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
MANUFACTURING TECHNOLOGY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) State the different of materials which are normally used for pattern making.
   (b) What are the common allowances provided on pattern and why?
2. (a) Describe the working of a cupola with neat sketch.
   (b) What are the main difficult encountered in cupola operations? Suggest their renaids.
3. (a) Explain the types of gas welding flames and undo what conditions they are used.
   (b) With a neat sketch explain thermit welding process.
4. (a) Explain in detail the gas metal arc welding process with a neat sketch.
   (b) Explain the principles of working of a laser beam welding process and lit the various lasers used.
5. (a) Discuss the advantages and limitations of hot and cold working process.
   (b) How do you estimate rolling load? What is the power required in rolling.
6. Explain the following in detail.
   (a) Blanking and Piercing
   (b) Tube drawing
   (c) Hot spinning
   (d) Stamping.
7. (a) Describe impact extrusim with a neat sketch. Write the applications.
   (b) Classify the methods of forging. Explain in detail any one of them.
8. (a) Explain the principle of electro chemical machining with neat sketch. Give the advantages of ECM.
   (b) How can you classify the rapid prototyping process.

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Code :9A03403 **3**

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
MANUFACTURING TECHNOLOGY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) How are patterns classified? Explain use of a solid pattern.
   (b) What do you understand from the term galling system? What are the main requirements expected from an ideal gating system?
2. (a) Explain in detail the investment casting process and discuss its merits and demerits.
   (b) Explain with a neat sketch of a centrifugal casting process. State its advantages and limitations.
3. (a) What are the basis requirements of a good weld? Explain different types of weld joins with neat sketches.
   (b) Describe the gas welding techniques? What are the advantages of gas welding.
4. (a) Explain with a neat sketch the principle working of TIG welding process.
   (b) Explain in detail the induction welding process.
5. (a) What is rollary? Sketch and explain a simple rolling process.
   (b) Write short note on the plastic blow moulding process.
6. (a) Describe the process of cold spinning stating its advantages and specific uses.
   (b) Explain with neat sketch the process of wire drawing. Also name the important process variables in drawing rod and wire.
7. (a) How direct extrusim differ from indirect extrusim. Give their relative morits and demerits.
   (b) What are the different hammers used in forging?
8. (a) Explain the working principles of laser beam machining with neat sketch. List the product applications of LBM.
   (b) Explain the working principle of fused deposition modeling with neat sketch. Give the appicates of this process.

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Code :9A03403 4

II B.Tech II Semester(R09) Regular Examinations, April/May 2011
MANUFACTURING TECHNOLOGY
(Mechanical Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) What are the factors to be considered in selecting a pattern materials?
   (b) What are different types of gates you know? Explain the with help of suitable stating their relative merits and demerits.
2. (a) Explain the term directional solidification as applied to castings.
   (b) What is a riser? What is meant by the term resering?
   (c) What advantages are provided by a riser.
3. Explain the following:
   (a) Forge welding
   (b) Acetylene gas cutting
   (c) Plasma welding.
4. (a) Differentiate between the soldering and brazing.
   (b) What are the different weld defects? And state its causes and remedies.
5. (a) What are the main comparisions of hot working and cold working process.
   (b) What is a continuous rolling mill? What are its advantages?
6. (a) Distinguish between bending and forming. What are the different types of bending Dies?
   (b) Explain the following terms applied to bending of sheet and plates.
      i. Spring back
      ii. Compensation for spring back.
7. (a) Describe with a neat sketch, how seamless tubes can be produced by extrasim.
   (b) Describe in detail the roll forging.
8. (a) Explain with neat sketch working principle of ultrasonic machine. Give the leading advantages of USM.
   (b) Explain selective laser sintering rapid prototype process with a neat sketch. Give the application of this process.

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