Hall Ticket Number :										

R-14

Code: 4G542

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Applied Thermodynamics - I

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Derive an expression for efficiency of Otto Cycle. 7M

   b) Find the air standard efficiency of a diesel cycle engine if the cut off is 6% of the stroke and the clearance is 1/13th of the stroke. Take γ =1.4 7M

OR

2. Explain the following relevant to actual cycles.
   i) Heat loss factor
   ii) Exhaust blowdown factor
   iii) Time loss factor 14M

UNIT–II

3. a) Explain the working of distributor type fuel injection pump with neat sketch. 7M

   b) Elucidate the working of forced circulation cooling system. 7M

OR

4. a) Discuss the difference between theoretical and actual valve timing diagram of a diesel engine. 10M

   b) Justify the need of lubrication in IC engines. 4M

UNIT–III

5. What is meant by abnormal combustion? Explain the phenomenon of knock in SI engine. 14M

OR

6. Explain with figures the various types of combustion chambers used in CI engines. 14M

UNIT–IV

7. The following data refer to a single cylinder four stroke petrol engine: Compression ratio=5.6, Mechanical efficiency = 80%, Brake specific fuel consumption=0.37kg/kW h, Calorific value of fuel = 44000 kJ/kg, Adiabatic index for air = 1.4, Find (i) brake thermal efficiency (ii) Indicated thermal efficiency (iii) Air standard efficiency. (iv) Relative efficiency with respect to indicated thermal efficiency and (v) Relative efficiency with respect to brake thermal efficiency. 14M

OR

8. In a trail of single cylinder oil engine working on dual cycle, the following observations were made.

   Compression ratio = 15 Oil Consumption = 10.2 kg/hr

   Calorific value of fuel = 43890 kJ/kg Air consumption = 3.8 kg/min

   Speed = 1900 rpm Torque on the brake drum = 186 N-m

   Quantity of cooling water used = 15.5 kg/min

   Temperature rise = 36^{o}C Exhaust Gas Temperature = 410^{o}C

   Room temperature = 20^{o}C Specific Heat of Exhaust Gas = 1.17 kJ/kg K

   Calculate (i) Brake Power (ii) Brake Specific Fuel Consumption (iii) Brake Thermal Efficiency. Also draw heat balance Sheet on minute Basis. 14M

UNIT–V

9. Following data relate to performance test of a single acting 14 cm * 14 cm reciprocating compressor. Suction pressure and temperature 1 bar 20^0C, discharge pressure and temperature are 6 bar, 180^0C, Speed of the compressor 1200 rpm, Shaft power 6.25 kW, Mass of air delivered 1.7 kg/min. Calculate the following
    i) The indicated power
    ii) The isothermal efficiency
    iii) The mechanical efficiency
    iv) The overall isothermal efficiency 14M

OR

10. a) With neat sketch, explain the working of Roots blower compressor. 7M

    b) Compare Rotary and Reciprocating Air Compressor. 7M

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Hall Ticket Number :										

R-14

Code: 4GC43

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Environmental Science

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Write a note on multidisciplinary nature of environmental studies. 7M

   b) How would environmental awareness help to protect our environment? 7M

OR

2. a) Write a note on public awareness of environmental studies. 7M

   b) Explain briefly the importance of environmental studies. 7M

UNIT–II

3. a) Define Mineral resources. Explain about use and environmental effects of extracting mineral resources. 7M

   b) Describe the impact of over grazing. 7M

OR

4. Discuss in brief account on role of an individual in the conservation of natural resources. 14M

UNIT–III

5. a) Explain the Forest ecosystem with suitable examples. 7M

   b) Write the formation of nitrogen cycle. 7M

OR

6. a) Discuss the desert ecosystem with suitable examples. 7M

   b) Explain brief about the conservation methods of biodiversity. 7M

UNIT–IV

7. a) Define Thermal pollution. Discuss in brief account on causes, effects and control measures of Thermal pollution 7M

   b) Write the effects of nuclear radiation on environment. 7M

OR

8. a) Write a detailed note on consequences of soil pollution. 7M

   b) Describe the causes of ozone layer depletion. 7M

UNIT–V

9. a) Explain in detail about the advantages of rain water harvesting. 7M

   b) Write a note on forest conservation act. 7M

OR

10. a) Describe family welfare programmes in India. 7M

    b) Value education has an important effect on environmental conservation. Justify. 7M

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Hall Ticket Number :										

R-15

Code: 4G544

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Manufacturing Technology

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. Sketch and Explain different types of patterns used in foundry.

OR

2. Calculate the ratio of solidification times of two steel cylindrical risers of sizes 36cm in diameter by 72 cm height and 72cm in diameter by 36 cm in height subjected to identical conditions of cooling.

UNIT–II

3. a) What are the various types of welded joints with sketch?

   b) Explain the following with neat sketches (i) Arc Welding (ii) Gas welding (iii) Forge welding

OR

4. Give the principle of Gas welding. Explain its construction with various types of flames.

UNIT–III

5. A 450 x 25mm strip is fed through a rolling mill with two powered rolls of radius 350mm. the strip thickness is to be reduced to 20mm in one pass at a roll speed of 60 rev/min. Yield strength of strip material is 175 N/mm^2.

   Determine (i) Coefficient of friction (ii) Roll force (iii) Power

OR

6. Write short notes on any Two of the following **(2X7=14M)**

   a) Deep drawing. b) Tube drawing c) Wire Drawing

UNIT–IV

7. Discuss the forward and backward extrusion process and their advantages, applications of process.

OR

8. Describe the following process with neat sketches and mention advantages and disadvantages

   (i) Drop Forging (ii) Roll forging (iii) Rotary forging

UNIT–V

9. a) What are some of the reasons why plastic shaping processes are important?

   b) Give the classification of various types of methods for processing plastics and its applications?

OR

10. a) Explain the effect of spring back? How it is compensated.

    b) Define the following

       i) Blanking.

       ii) Piercing

       iii) Trimming.

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Hall Ticket Number :										

R-14

Code: 4GC42

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Probability and Statistics

(Common to CE, ME and CSE)

Max. Marks: 70 Time: 3 Hours

PART-A

Answer *the following* units by choosing one question from each unit (3 x 14 = 42 Marks)

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UNIT–I

1. Given P(A)=1/4, P(B)=1/3 and $P(A\cup B)=1/2$, then evaluate $P(A/B)$, $P(B/A)$, $P(A\cap B')$ and $P(A'/B')$ 14M

OR

2. A random variable X has the following probability function values of X.

x:	-2	-1	0	1	2	3
p(x):	0.1	K	0.2	2k	0.3	k

Find the value k, $P(X\geq -1)$, $P(X\leq 2)$, mean and variance 14M

UNIT–II

3. a) The probability that a pen manufactured by a company will be defective is 1/10. If 12 such pens are manufactured, find the probability that (a) exactly two will defective, (b) at least two will be defective and (c) none will be defective. 7M

   b) Fit a Poisson distribution to the frequency distribution

x:	0	1	2	3	4
f:	46	38	22	9	1

7M

OR

4. a) The weekly wages of workers in a company are normally distributed with mean of Rs. 700 and standard deviation of Rs. 50. Find the probability that the weekly wage of a randomly chosen worker is (i) between Rs. 650 and Rs. 750, and (ii) more than Rs. 750. 7M

   b) For the normal distribution with mean 2 and standard deviation 4, evaluate (i) $P(-6<x<3)$, (ii) $P\{x\geq 5\}$ and (iii) $P(\{|x|<4\})$. 7M

UNIT–III

5. A population consists of the four numbers 3, 7, 11, 15. Consider all possible samples of size 2 which can be drawn with replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 14M

OR

6. a) The standard deviation of the life-times of television tubes manufactured by a company is estimated as 100 hours. Find how large a sample must be taken in order to be 99% confident that the error in the estimated mean life-time will not exceed 20 hours 7M

   b) Find 95% confidence limits for the mean of a normality distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14. 7M

UNIT–IV

7. a) A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population 7M

   b) Experience had shown that 20% of a manufactured product is of the top quality. In one day production of 400 articles only 50 are of top quality. Test the hypothesis at 0.05 level 7M

OR

8. The mean yield of wheat from a district A was 210 pounds with S.D 2.5 inches per acer from a sample of 100 plots. In another district the mean yield was 220 pounds with S.D 12 pounds from a sample of 150 plots. Assuming that the S.D of yield in the entire state was 11 pounds. Test whether there is any significant difference between the mean yield of crops in the two districts 14M

UNIT–V

9. In an investigation on the machine performance, the following results are obtained

	No. of units inspected	No. of defectives
Machine I	375	17
Machine II	450	22

Test whether there is any significant performance of two machines at $\alpha = 0.05$ 14M

OR

10. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees

Employees

Soft Drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

14M

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