Hall Ticket Number :										

R-14

Code: 4G542

II B.Tech. II Semester Supplementary Examinations August 2021

Applied Thermodynamics-I

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) List out the major losses in Actual cycles of IC Engines. 6M

   b) What are Air standard cycles? What are the assumptions made in the air standard cycles? Write down the equation used for estimating the thermal efficiency of Air standard otto cycle in terms of compression ratio? 8M

OR

2. a) The minimum pressure and temperature in an Otto cycle are 100 KPa and 30^0 C. The amount of heat added to the air per cycle is 1500 KJ/Kg. i) Calculate the pressure and temperature at all the points. ii) Calculate specific work and thermal efficiency of the cycle for a compression ratio of 9. 10M

   b) Why the actual cycle efficiency is much lower the air standard cycle efficiency? 4M

UNIT–II

3. a) List out the differences between two stroke engine and four stroke engine. 7M

   b) Elucidate the working of forced circulation cooling system with the help of neat sketch. 7M

OR

4. a) What is carburetion? Explain the working of Simple Carburetor with neat sketch. 10M

   b) Compare and contrast between S.I engines with C.I engines. 4M

UNIT–III

5. a) List out the characteristics of good combustion chambers and its types used in SI engines. 6M

   b) Explain the phenomena of knocking in petrol engines. 8M

OR

6. List the various types of combustion chambers used in CI engines and explain them with the help of neat sketch. 14M

UNIT–IV

7. Explain the measurement of friction power by the following methods.
   i) Willan's line method. ii) Motoring Test 14M

OR

8. A four cylinder, four stroke petrol engine has a 10 cm bore, 15 cm stroke and uses a compression ratio of 6. The engine develops 25 kW indicated power at 2000 rpm. Find the mean indicated pressure and air standard efficiency. Also calculate the fuel consumption per hour, if the indicated thermal efficiency is 30%. Take the calorific value of fuel as 42 MJ/kg. 14M

UNIT–V

9. a) Explain the working principle of axial compressor with a neat sketch. Draw its velocity triangles and Show its velocity and pressure variation. 10M

   b) Write short notes about the importance of Intercooler used in air compressors. 4M

OR

10. a) With a neat sketch explain the working of roots blower and derive the expression for roots efficiency. 10M

    b) Write a short notes on multistage compression. 4M

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Hall Ticket Number :										

R-14

Code: 4GC42

II B.Tech. II Semester Supplementary Examinations August 2021

Probability & Statistics

(Common to CE, ME and IT)

Max. Marks: 70 Time: 3 Hours

Answer *any five* full questions by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Define the following (i) Sample Space (ii) event (iii) Outcome (iv) Probability 8M

   b) Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and15 orange marbles, with replacement being made after each drawing. Find the probability that (i) both are white (ii) first is red and second is white. 6M

OR

2. a) State and prove Addition theorem on probability for two events. 8M

   b) If two dice are throw , Find the probability of getting a sum is10 6M

UNIT–II

3. A random variable X has the following probability function

X	0	1	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$7K^2+K$

Find the value of K , (ii)Evaluate $p(0 < x < 5)$, (iii) Evaluate $p(x < 5)$ 14M

OR

4. The mean and variance of a binomial variable X with parameters n and p are 16 and 8. Find P(x ≥ 1) and P(x > 2) 14M

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. It is desired to estimate the mean number of hours of continuous use untila certain computer will first require repairs. If it can be assumed that ± =48 hours, how large abe needed so that one will be able to assert with 90% confidence that the sample mean is off by at most 10 hours. 14M

UNIT–IV

7. a) A sample of 64 students has a mean weight of 70 kg. can this be regarded as a sample from a population with mean weight 56kg. and standard deviation is 25 kg. 7M

   b) In a big city, 325 men out of 600 men were found to be smokers. Thus this information supports the concussion that the majority of men in the city are smokers. 7M

OR

8. According to the norms established for a mechanical aptitude test, persons who are 18 years old have an average height 73.2 ($« = 73.2$) with standard deviation of 8.6($\pm = 8.6$). If 45 ($n = 45$) members randomly selected of that age average 76.7($\overline{x} = 76.7$). Test the null hypothesis $« = 73.2$, against the alternative hypothesis $« > 73.2$ at the 0.01 level if significance. 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 α = 0.05 14M

OR

10. 4 coins were tossed 160 times and the following results were obtained,

No, of Heads	0	1	2	3	4
Frequency	17	52	54	31	6

Under the assumption that coins are unbiased, find the expected frequencies of 0,1,2,3,4 heads and test the googness of fit for α=0.05 14M

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