Code No: RR220303 **RR** **Set No. 2**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Common to Mechanical Engineering, Automobile Engineering
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. The data recorded during a trial of a single cylinder four stroke diesel engine are bore 300 mm, stroke 400 mm speed 210 rpm, area of indicator diagram 322 mm^2, length of indicator diagram 62 mm, spring index 110 kPa / mm, brake drum radius 800mm, net brake load 1350 N, fuel consumption 7 kg / h, jacket cooling water 500 kg / h temperature rise of cooling water 38^{o}C, exhaust gas temperature 300^{o}C, air consumption 300 kg / h, room temperature 20^{o}C calorific value of fuel 44 MJ / kg, Determine,
   (a) indicated power,
   (b) brake power,
   (c) mechanical efficiency
   (d) thermal efficiency. Also draw up heat balance sheet for engine trail. Take specific heat of exhaust gases 1.005 kJ / kg K [16]

2. (a) Write the differences between refrigerator and heat pump? Derive the COP for both of them?
   (b) Calculate the power required to run a refrigerator producing 500 kg/hr of ice at -5^{0}C when the water is supplied at 15^{0}C. Take C_p = 2.0 kJ/kg K for the ice and latent heat of freezing as 315 kJ/kg. [8+8]

3. (a) Write a note on psychrometric chart and its utility value in airconditioning.
   (b) Explain the working of winter acirconditioning system with a neat sketch. [8+8]

4. (a) State the uses of compressed air in engineering.
   (b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]

5. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.
   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [8+8]

6. (a) List the various types of rotary compressors?
   (b) Explain with a neat sketch, the working of a roots blower. [10+6]

7. (a) In addition to confining the air within a given volume, what other important function does the C.I engine combustion chamber perform?

(b) What are the two general types of combustion Chambers used in C.I engines? Describe the process of mixing fuel and air in these chambers. [10+6]

8. (a) What are the differences between S.I. Engine over C.I. Engine?

(b) What are the parts that require lubrication in an IC Engine? [16]

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Code No: RR220303 **RR** **Set No. 4**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Common to Mechanical Engineering, Automobile Engineering
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Write a note on psychrometric chart and its utility value in airconditioning.
   (b) Explain the working of winter acirconditioning system with a neat sketch. [8+8]

2. (a) Write the differences between refrigerator and heat pump? Derive the COP for both of them?
   (b) Calculate the power required to run a refrigerator producing 500 kg/hr of ice at -5^{0}C when the water is supplied at 15^{0}C. Take C_p = 2.0 kJ/kg K for the ice and latent heat of freezing as 315 kJ/kg. [8+8]

3. The data recorded during a trial of a single cylinder four stroke diesel engine are bore 300 mm, stroke 400 mm speed 210 rpm, area of indicator diagram 322 mm^2, length of indicator diagram 62 mm, spring index 110 kPa / mm, brake drum radius 800mm, net brake load 1350 N, fuel consumption 7 kg / h, jacket cooling water 500 kg / h temperature rise of cooling water 38^{o}C, exhaust gas temperature 300^{o}C, air consumption 300 kg / h, room temperature 20^{o}C calorific value of fuel 44 MJ / kg, Determine,
   (a) indicated power,
   (b) brake power,
   (c) mechanical efficiency
   (d) thermal efficiency. Also draw up heat balance sheet for engine trail. Take specific heat of exhaust gases 1.005 kJ / kg K [16]

4. (a) State the uses of compressed air in engineering.
   (b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]

5. (a) What are the differences between S.I. Engine over C.I. Engine?
   (b) What are the parts that require lubrication in an IC Engine? [8+8]

6. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.
   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [8+8]

7. (a) In addition to confining the air within a given volume, what other important function does the C.I engine combustion chamber perform?

(b) What are the two general types of combustion Chambers used in C.I engines? Describe the process of mixing fuel and air in these chambers. [10+6]

8. (a) List the various types of rotary compressors?

(b) Explain with a neat sketch, the working of a roots blower. [10+6]

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Code No: RR220303 **RR** **Set No. 1**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Common to Mechanical Engineering, Automobile Engineering
Time: 3 hours **Max Marks: 80**
Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Write the differences between refrigerator and heat pump? Derive the COP for both of them?
   (b) Calculate the power required to run a refrigerator producing 500 kg/hr of ice at -5^{0}C when the water is supplied at 15^{0}C. Take C_p = 2.0 kJ/kg K for the ice and latent heat of freezing as 315 kJ/kg. [8+8]
2. (a) State the uses of compressed air in engineering.
   (b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]
3. (a) List the various types of rotary compressors?
   (b) Explain with a neat sketch, the working of a roots blower. [10+6]
4. The data recorded during a trial of a single cylinder four stroke diesel engine are bore 300 mm, stroke 400 mm speed 210 rpm, area of indicator diagram 322 mm^2, length of indicator diagram 62 mm, spring index 110 kPa / mm, brake drum radius 800mm, net brake load 1350 N, fuel consumption 7 kg / h, jacket cooling water 500 kg / h temperature rise of cooling water 38^{o}C, exhaust gas temperature 300^{o}C, air consumption 300 kg / h, room temperature 20^{o}C calorific value of fuel 44 MJ / kg, Determine,
   (a) indicated power,
   (b) brake power,
   (c) mechanical efficiency
   (d) thermal efficiency. Also draw up heat balance sheet for engine trail. Take specific heat of exhaust gases 1.005 kJ / kg K [16]
5. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.
   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [8+8]
6. (a) In addition to confining the air within a given volume, what other important function does the C.I engine combustion chamber perform?
   (b) What are the two general types of combustion Chambers used in C.I engines? Describe the process of mixing fuel and air in these chambers. [10+6]

7. (a) Write a note on psychrometric chart and its utility value in airconditioning.
   (b) Explain the working of winter acirconditioning system with a neat sketch. [8+8]

8. (a) What are the differences between S.I. Engine over C.I. Engine?
   (b) What are the parts that require lubrication in an IC Engine? [8+8]

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Code No: RR220303 **RR** **Set No. 3**

II B.Tech II Semester Examinations,December 2010
THERMAL ENGINEERING - I
Common to Mechanical Engineering, Automobile Engineering
Time: 3 hours **Max Marks: 80**
Answer any FIVE Questions
All Questions carry equal marks
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1. (a) What are the differences between S.I. Engine over C.I. Engine?
   (b) What are the parts that require lubrication in an IC Engine? [8+8]
2. (a) In addition to confining the air within a given volume, what other important function does the C.I engine combustion chamber perform?
   (b) What are the two general types of combustion Chambers used in C.I engines? Describe the process of mixing fuel and air in these chambers. [10+6]
3. (a) How can be the possibility of detonation be reduced at the design stage in S.I. engines.
   (b) Explain the desirable point in the cycle to obtain the peak pressure and discuss its importance. [8+8]
4. The data recorded during a trial of a single cylinder four stroke diesel engine are bore 300 mm, stroke 400 mm speed 210 rpm, area of indicator diagram 322 mm^2, length of indicator diagram 62 mm, spring index 110 kPa / mm, brake drum radius 800mm, net brake load 1350 N, fuel consumption 7 kg / h, jacket cooling water 500 kg / h temperature rise of cooling water 38^{o}C, exhaust gas temperature 300^{o}C, air consumption 300 kg / h, room temperature 20^{o}C calorific value of fuel 44 MJ / kg, Determine,
   (a) indicated power,
   (b) brake power,
   (c) mechanical efficiency
   (d) thermal efficiency. Also draw up heat balance sheet for engine trail. Take specific heat of exhaust gases 1.005 kJ / kg K [16]
5. (a) List the various types of rotary compressors?
   (b) Explain with a neat sketch, the working of a roots blower. [10+6]
6. (a) Write the differences between refrigerator and heat pump? Derive the COP for both of them?
   (b) Calculate the power required to run a refrigerator producing 500 kg/hr of ice at -5^{0}C when the water is supplied at 15^{0}C. Take C_p = 2.0 kJ/kg K for the ice and latent heat of freezing as 315 kJ/kg. [8+8]
7. (a) State the uses of compressed air in engineering.

(b) Working from first principles, derive an expression for work done on air in a reciprocating compressor in terms of the pressure ratio. [6+10]

8. (a) Write a note on psychrometric chart and its utility value in airconditioning.

(b) Explain the working of winter acirconditioning system with a neat sketch. [8+8]

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