Code No: RR221803 **Set No. 1**

II B.Tech II Semester Supplementary Examinations, Nov/Dec 2005
FUELS FURNACES AND REFRACTORIES
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Describe any test to study the changes that occur in coals during Carburization
   (b) What are the properties and uses of bye products of coke manufacture? [8+8]
2. (a) With the aid of a neat sketch explain the fractional distillation of crude oil.
   (b) Explain what you mean by catalytic cracking. [10+6]
3. (a) Explain the concept of Black body.
   (b) Discuss about emisssivity of materials. [8+8]
4. (a) Derive the reciprocity theorem when the heat exchange is taking place in grey bodies.
   (b) Two parallel grey surfaces have emissivities of 0.8 and 0.7 and are maintained at $260^0 C$and $537^0 C$. What is the net radiation heat exchange between them ($\tau = 5.67 \times 10^{-8} W/m^2 K^4$) [7+9]
5. (a) Describe the characteristic features of open hearth furnace with a neat diagram.
   (b) Explain how an electric resistance tubular furnace works. [8+8]
6. (a) Explain how a thermoelectric pyrometer can be used to maintain the temperature in a furnace.
   (b) Explain the various methods of measuring e.m.f. [8+8]
7. (a) Explain Planks distributive law.
   (b) Explain the Principle and operation of an optical pyrometer. What are its uses. [6+10]
8. What the properties of silica refractories? Explain. Describe the manufacture of silica bricks by any one method. [16]

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Code No: RR221803 **Set No. 2**

II B.Tech II Semester Supplementary Examinations, Nov/Dec 2005
FUELS FURNACES AND REFRACTORIES
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the Insitu theory of origin and formation of coals.
   (b) Give the calorific value of various types of coals and indicate their respective uses. [8+8]
2. (a) With the aid of a neat sketch explain the fractional distillation of crude oil.
   (b) Explain what you mean by catalytic cracking. [10+6]
3. (a) Explain the concept of Black body.
   (b) Discuss about emisssivity of materials. [8+8]
4. (a) Derive Newton- Rikman law for a fluid in contact with a solid boundary.
   (b) Describe various types of heat exchangers based on temperature distribution. [8+8]
5. (a) Discuss the importance of waste heat recovery in Metallurgical furnaces.
   (b) Explain in detail the characteristic features of Arc furnaces. [8+8]
6. (a) Explain peltier and Thomson effects.
   (b) Give the composition and uses of various thermocouple materials
   (c) What is a thermopile. [7+7+2]
7. (a) Explain in detail the principle, Construction and working of a resistance thermo meter.
   (b) Name some applications of resistance pyrometer. [10+6]
8. Explain the following:
   (a) Failure of refractories in service.
   (b) Application of refractories in Metallurgical Industsry. [8+8]

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Code No: RR221803 **Set No. 3**

II B.Tech II Semester Supplementary Examinations, Nov/Dec 2005
FUELS FURNACES AND REFRACTORIES
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the advantages and disadvantages of solid, liquid and gaseous fuels?
   (b) Give the classification of primary and secondary fuels with suitable example. [9+7]
2. Explain the following processes of crude oil distillation.
   (a) Thermal cracking.
   (b) Catalytic cracking. [8+8]
3. (a) Explain conduction, Convection and radiation with suitable examples
   (b) Explain what you mean by steady state and unsteady state conduction. [8+8]
4. Explain the following:
   (a) Reynolds Number
   (b) Nusselts Number
   (c) Log mean temperature difference. [5+5+6]
5. (a) Describe a cupola. Explain the refractories used in it.
   (b) Describe an Induction furnace. What is its principle and working. [8+8]
6. (a) What is see beck effect?
   (b) What are the properties that are required in a thermocouple? Explain. [4+12]
7. (a) Explain Weins law of monochromatic radiation.
   (b) Write the Principle, Construction and working of a F and F optical pyrometer (Wedge type). [7+9]
8. What the properties of silica refractories? Explain. Describe the manufacture of silica bricks by any one method. [16]

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Code No: RR221803 **Set No. 4**

II B.Tech II Semester Supplementary Examinations, Nov/Dec 2005
FUELS FURNACES AND REFRACTORIES
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the Insitu theory of origin and formation of coals.
   (b) Give the calorific value of various types of coals and indicate their respective uses. [8+8]
2. (a) With the aid of a neat sketch explain the fractional distillation of crude oil.
   (b) Explain what you mean by catalytic cracking. [10+6]
3. What is Stefan Boltzman law? How is it used for heat transfer by radiation? [16]
4. Explain the following:
   (a) Reynolds Number
   (b) Nusselts Number
   (c) Log mean temperature difference. [5+5+6]
5. (a) Describe the characteristic features of open hearth furnace with a neat diagram.
   (b) Explain how an electric resistance tubular furnace works. [8+8]
6. (a) What is a thermocouple? Explain its working.
   (b) What are the various types of thermocouples you know? Give examples. [8+8]
7. (a) Explain the Principle and working of a total radiation pyrometer.
   (b) What are the disadvantages of radiation pyrometers over thermo electric pyrometers. [8+8]
8. Explain the following:
   (a) Failure of refractories in service.
   (b) Application of refractories in Metallurgical Industsry. [8+8]

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