

Code No:RR-210105

Set No.

1

II B.Tech I Semester – Supplementary-Examinations May-2005
MECHANICAL AND ELECTRICAL SCIENCE
(Civil Engineering)

Time: 3 hours

Maximum marks: 80

Answer THREE questions from each part
All questions carry equal marks

(Part –A – Electrical Science)

1. Explain the construction of a DC machine with a neat sketch.
2. From the fundamental, derive the expression for the Torque.
3. Explain the phasor diagram of a transformer 'on load' with lagging pf.
4. Derive from first principles the emf equation of an alternator.
- 5.a) Explain the advantages and disadvantages of Moving Iron instruments.
b) Explain the working of moving iron attraction type instruments.

(Part –B – Mechanical Science)

- 1.a) Define:
 - i) Bore
 - ii) Stroke
 - iii) Displacement of an I.C. Engine and mention their units.
b) With neat sketches explain the working of 4-stroke cycle petrol engine.
- 2.a) Differentiate between physical and thermodynamic properties of a refrigerant. Explain which are more important giving specific examples.
b) What is a secondary refrigerant? Where it is used?
- 3.a) What are the different types of welding? Discuss their applications?
b) Describe working principle and operation of oxygen cutting.
- 4.a) Enumerate difference between shaper and planer.
b) What are different operations than can be performed on shape and planer?
- 5.a) Discuss how the size of a power shovel is determined.
b) Give two advantages of Conveyor Installations?

&&&

II B.Tech I Semester – Supplementary-Examinations May-2005
MECHANICAL AND ELECTRICAL SCIENCE
(Civil Engineering)

Time: 3 hours

Maximum marks: 80

Answer THREE questions from each part
All questions carry equal marks

(Part –A – Electrical Science)

1. Derive an expression for generated emf, and also explain various types of excitations.
2. Discuss the losses in a dc machine.
3. Discuss the operation of a transformer and sketch the phasor diagram for leading power factor.
- 4.a) Explain the working principle of a three phase induction motor.
b) Explain applications of induction motor.
5. What are the essential devices in indicating instruments? Explain each of them briefly

(Part –B – Mechanical Science)

- 1.a) What is the function of a carburettor in an I.C. engine?
b) Explain with the help of a neat sketch, the working of a two-stroke petrol engine.
- 2.a) Discuss briefly the factors affecting the choice of refrigerants commonly used in refrigerating plants.
b) What are the advantages and disadvantages of using air as refrigerant as compared to R-12 and NH_3 ?
- 3.a) Describe the typical equipment used by welder in the arc welding process.
b) With the neat sketch of describe briefly about oxyacetylene torch.
- 4.a) Name the different types of milling machines used in industry and write their applications.
b) What are the common operations done on a drilling machine? State their uses.
5. a) How do you select the size of a power shovel ?
b) Where and why Conveyors are used?

&&&

II B.Tech I Semester – Supplementary-Examinations May-2005
MECHANICAL AND ELECTRICAL SCIENCE
(Civil Engineering)

Time: 3 hours

Maximum marks: 80

Answer THREE questions from each part
All questions carry equal marks

(Part –A – Electrical Science)

1. Discuss the types of DC generators and explain various parts of DC generator.
2. Derive the expression for the speed in terms of back emf (E_b), and flux (ϕ).
3. Draw the general schematic of a single phase transformer and explain its working principle.
4. Sketch and explain the open circuit and short circuit characteristics of a synchronous machine and also discuss the tests to be conducted to obtain those characteristics.
5. What are the essential devices in indicating instruments? Explain each of them briefly

(Part –B – Mechanical Science)

1. a) Define:
 - i) Compression ratio
 - ii) TDC and BDC of an I.C. engine.b) Explain clearly how the I.C. Engines are classified on the basis of cylinder arrangement, cycle of operation, method of charging and engine cylinder, type or ignition and type of cooling.
- 2.a) How the refrigerants are classified?
b) What are the essential properties of a good refrigerant?
- 3.a) Define welding and discuss the classification of welding.
b) Discuss the advantages and disadvantages of gas cutting and arc cutting.
- 4.a) What are the important parts of a planer? Explain the importance of each part.
b) Discuss the following milling operations:
 - i) Slab milling
 - ii) Face milling
 - iii) Thread milling
 - iv) Gang milling
- 5.a) How the optimum depth of cut is determined for the power shovel ?
b) What types of materials can be handled by Screw Conveyors?

&&&

Code No:RR-210105

Set No.

4

II B.Tech I Semester – Supplementary-Examinations May-2005
MECHANICAL AND ELECTRICAL SCIENCE
(Civil Engineering)

Time: 3 hours

Maximum marks: 80

Answer THREE questions from each part
All questions carry equal marks

(Part –A – Electrical Science)

1. Explain the characteristics of separately excited DC generator.
2. Why do we need a starter? Explain the operation of 3-point starter with a neat sketch.
3. 'Voltage regulation of a transformer varies with power factor', validate the statement through suitable explanation.
4. What is synchronous impedance and explain the tests to be conducted to measure the same.
- 5.a) Explain the advantages and disadvantages of Moving Iron instruments.
b) Explain the working of moving iron attraction type instruments.

(Part –B – Mechanical Science)

1. a) Define:
i) Indicated and Brake thermal efficiencies
ii) Mechanical efficiency of an I.C. Engine.
b) Draw a neat diagram of an I.C. Engine and mark the parts.
- 2.a) Define a refrigerant. Can water be used as a refrigerant?
b) Discuss the importance of boiling point and freezing point of the following refrigerants with reference to their application: R-11, R-12, R-22, R-717 and R-13.
- 3.a) What are the different kinds of welding rods? Explain them briefly.
b) Distinguish between arc welding and gas welding process.
- 4.a) Explain the following lathe operations:
i) Knurling ii) Chamfering iii) Facing iv) Filing
b) What is indexing? Explain the different methods of indexing.
c) Describe with the help of neat sketches the following work holding devices used in planer.

Contd...2

- i) Compressive clamping ii) Adjustable screw top
- 5.a) What are the factors effecting the output of power shovel ? Discuss any two.
- b) What types of materials can be handled by Pneumatic Conveyors?

._*._*._*_