10:00 to 01:00

10/01/23

(75)

Course Code: SOE-B-ME303

O P JINDAL UNIVERSITY

B. Tech. III Semester Regular Examinations

MECHANICS OF MATERIALS

MECHANICAL ENGINEERING

Time: 3 Hrs. **Max. Marks: 100**

Answer any one question from each unit

All questions carry equal marks

			M	CO	KL
Section-A					
1	a.	What is proof Stress?	2	1	1
	b.	How stress and strain are related?	2	1,3	1
	c.	How thermal stresses are setup in any material?	2	1,3	1
	d.	What do you mean by principal stresses?	2	1	1
	e.	What is resilience?	2	1	1
	f.	Name any two failure theories?	2	1,3	1
	g.	State any two assumptions made under theory of simple bending.	2	1,4	1
	h.	What is moment of resistance?	2	1,4	1
	i.	Why I section beams are preferred for structural applications?	2	1,4	1
	j.	What is Torsion?	2	1	1
Section-B: Unit-I					
2	a.	What is stress? In what way does the shear stress is different from direct stress.	6	1	1
	b.	A steel bar 35x35 mm in section and 100 mm long is acted upon by a tensile load of 150 kN along its longitudinal axis and 400 and 300 kN along the lateral surface axes. Determine the change in volume of bar.	10	1,3	2
OR					
3	a.	Define the term Poisson's Ratio. Write expressions for strains in the three principal directions, subjected to Tri-axial stress system.	6	1	1
	b.	Explain different types of modulus known to you. Deduce a relationship between Elastic and Bulk modulus constants.	10	1	1
Unit-II					
4	a.	What is maximum principal stress theory? Explain the condition of failure.	6	1	1
	b.	Draw SFD and BMD for a simply supported beam carrying a UVL of 0 to w kN/m over its whole span.	10	2	2
OR					
5	a.	Define point of Contraflexure. Draw SFD and BMD for an overhanging beam having UDL over its whole span, considering supports symmetrically placed.	6	2	2

	b.	A 14 meter cantilever is loaded as per the following details. From the fixed support end, Point load of 6 kN is acting at a distance of 2 m, 4kN at 4m, 6kN at 7m, 4 kN at free end. A UDL of 2 kN/m is also acting at a length of 6m starting from 4th meter point from the fixed end. Draw the shear stress and bending moment diagrams.	10	2,3	3
Unit-III					
6	a.	What is pure bending? Derive pure bending equation.	6	4	1
	b.	A hollow circular bar used as a beam has an outer diameter 1.5 times the inner diameter. If it is subjected to maximum bending moment 50 kN-m and allowable bending stress is 120 MPa, determine the inner diameter.	10	4	2
OR					
7	a.	What is neutral axis. A circular shaft having bending stress of 90 MPa is resisting 30 kN-m, calculate the diameter of shaft.	6	3,4	1
	b.	A cast iron pipe with a 200 mm internal diameter and 10 mm thick is supported at two points 10 m apart. Determine the maximum stress in the pipe material when it runs half. The density of pipe material is 70 kN/m^3 and of water is 9.81 kN/m^3.	10	1,3, 4	2
Unit-IV					
8	a.	What is flexural rigidity? Derive the governing differential equation for the calculation of Slope and deflection of beam.	6	4	1
	b.	Derive expression for slope and deflection for a cantilever beam carrying a point load at its free end.	10	4	2
OR					
9	a.	What is shear centre? Explain its significance.	6	1,3, 4	1
	b.	Derive expression for slope and deflection for a cantilever beam carrying a UDL all over its span.	10	1,3, 4	2
UNIT-V					
10	a.	What are columns? Define Slenderness ratio and its significance.	6	4	1
	b.	**Derive torsional equation for a circular shaft.**	10	3,4	1
OR					
11	a.	**What are the assumptions made in the theory of torsion?**	6	3,4	1
	b.	A solid steel shaft transmits 800 kW at 210 rpm. Determine the actual working stress and the diameter of the shaft if it twists one degree on a length of 18 diameters and shear stress is not to exceed 50 MPa. Take G = 81 GPa.	10	3,4	2

Course Code: SOE-B-ME304

O P JINDAL UNIVERSITY

B. Tech. III Semester Regular Examinations — **R 20**

ENGINEERING METALLURGY

(Offered to Mechanical Engineering / 01UG040)

Time: 3 Hrs. **Max. Marks: 100**

Questions 1 and 6 are compulsory

For each question, wherever necessary, a separate diagram is to be drawn

			M	CO	KL
1		State TRUE or FALSE, Justify your answer.			
	a	Hydroxyapatite is $Ca_{10}(OH_4)_6PO_2$	2	2	1
	b	Fe-0.8C steel would be preferred for making two-wheeler engine heads	2	1	1
	c	Cementite contains 4.3%C in it	2	1	1
	d	The lever rule is used to identify the temperature of different phases	2	2	1
	e	Jominy end quench test is used to identify the Hardness of a steel	2	3	1
	f	Cu-Pb alloy is used for soldering purposes	2	1	1
	g	Duralumin contains Al, Zn, Ag, and Mn	2	7	1
	h	Brass is an alloy of copper and tin	2	9	1
	i	Duralumin is a heavy and dense metal alloy	2	1	1
	j	Recrystallization temperature is directly proportional to the degree of cold work	2	6	1
2	a.	Apply the lever rule at two different positions on the Fe-Fe_3C diagram and show calculations for different phase identification. (draw a separate diagram to show different levers and fulcrums, assume the necessary information)	8	1	2
	b.	Explain the phenomenon of Recovery, Recrystallization, Grain Growth and discuss it elaborately.	8	6	2
		OR			
2	c.	Apply the lever rule to identify (1) % of Liquid and Austenite (2) % of Austenite and Cementite. Assume the suitable fulcrum point as per your choice. (draw a separate diagram to show different levers and fulcrums)	8	1	2
	d.	Draw the strength and ductility trend from Recovery, Recrystallization, Grain Growth perspective and discuss it elaborately.	8	6	2
3	a.	Describe and elaborate a method to measure hardenability.	8	4	2
	b.	Elaborate in detail, with a proper diagram, the reason why hypereutectoid steels can be preferred to heat above the A1 line for the hardening process.	8	7	2
		OR			
3	c.	Describe Jominy End Quench Test and discuss it elaborately.	8	4	2
	d.	Discuss at what temperature would you heat a steel containing 1.5%C for the hardening process. (draw a suitable diagram to support your discussion)	8	7	2

4	a.	Mention any 4 mechanical properties of metals, and describe their effects on the metal behavior.	8	5	2
	b.	Describe the stepwise procedure for the microstructural examination of a raw metal piece.	8	8	2
		OR			
4	c.	Discuss the effects on the mechanical behavior of metal from the perspective of Hardness, Toughness, Brittleness, and Ductility.	8	5	2
	d.	Describe the principle of an optical microscope and elaborate steps to prepare a metal sample for the same.	8	8	2
5	a.	Draw TTT diagram and discuss it elaborately. Throw some light on the term CCR.	8	3	3
	b.	Draw Hardening and Annealing temperature ranges on the steel portion of the iron-iron carbide phase diagram and discuss it elaborately.	8	4	3
		OR			
5	c.	Draw CCT diagram and discuss it elaborately. Throw some light on the term CCR.	8	3	3
	d.	Draw Hardening and Normalizing temperature ranges on the steel portion of the iron-iron carbide phase diagram and discuss it elaborately.	8	4	3
6		Draw a well labeled Iron-Iron Carbide Phase Diagram and discuss it elaborately.	16	3	3

16/01/23

Course Code: SOE-B-CE305

O P JINDAL UNIVERSITY

B. Tech. III Semester Regular Examinations

Disaster Management (Online)

(Offered to CE, ME, EE)

Time: 02 Hrs. **Max. Marks: 50**

Answer any one question from each unit

All questions carry equal marks

			M	CO	KL
Unit-I (10 marks)					
1	a.	Define the term 'Disaster'?	2	1	I
	b.	Summarize the various types of floods?	8	1	II
OR					
2	a.	Summarize the various types of droughts?	5	1	II
	b.	What are the various causes of forest fires?	5	1	I
Unit-II (10 marks)					
3	a.	Write down the process of EIA?	6	2	II
	b.	What are the shortcomings of EIA?	4	2	II
OR					
4	a.	What are the major elements of land-use planning?	4	2	I
	b.	Write a short note on "Traditional Disaster Resistant Construction Techniques"?	6	4	II
Unit-III (10 marks)					
5	a.	Write down the methods to mitigate the impact of the Tsunami?	5	3	II
	b.	Briefly illustrate various methods to mitigate the impact of cyclones?	5	3	II
OR					
6	a.	Briefly describe various methods to mitigate the damage due to Earthquake?	5	3	II
	b.	What are the various causes of Epidemics?	5	3	I
Unit-IV (10 marks)					
7	a.	Draw Disaster management cycle and briefly describe each term?	10	4	II
OR					
8	a.	Summarize the phases, focus, objectives and distinctive features of Community Based Disaster Management (CBDM)?	10	4	II
UNIT-V (10 marks)					
9	a.	What is NDRF and its role in case of disasters?	5	5	I
	b.	What are the other activities beside search and rescue operations undertaken during emergency situation in which NDRF is engaged?	5	5	I
OR					
10	a.	What are the immediate and long-term response of (i) Cyclone & (ii) Drought?	10	5	I

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18/01/23
75

Course Code: SOE-B-ME305

O P JINDAL UNIVERSITY

B. Tech. III Semester Regular Examinations

PLANT MAINTENANCE AND SAFETY

(Offered to ME)

Time: 3 Hrs. **Max. Marks: 100**

Answer any one question from each unit

All questions carry equal marks

			M	CO	KL
Section-A					
1	a.	Define Maintenance Engineering.	2	1	1
	b.	What are the objectives of Maintenance Engineering?	2	1	1
	c.	What is a decision tree?	2	2	1
	d.	Differentiate between Faults and Failures.	2	2	1
	e.	What is a periodic inspection?	2	3	1
	f.	What are the benefits of overhauling?	2	3	1
	g.	According to OSHA, red color is used for which kind of hazard?	2	4	1
	h.	What are the various classes of fire?	2	4	1
	i.	What is grouting?	2	5	1
	j.	Name various erection equipment.	2	5	1
Section-B: Unit-I					
2	a.	What are the various types of corrosion? Explain in detail about any two.	6	1	2
	b.	Machines in a factory have increased cost as they continue in service due to increased running cost. The initial running cost is Rs 3,500 and resale price drops as time passes until it reaches a constant value of Rs 500. Determine the proper length of service before machines should be replaced. Cost data are given below.	10	1	3

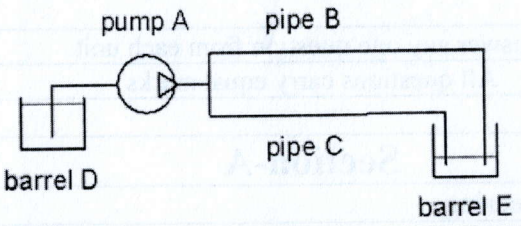
Year	1	2	3	4	5
Running Cost	1800	2200	2700	3200	3700
Resale Value	1900	1050	600	500	500

OR

3	a.	Explain risk-based maintenance and time-based maintenance in detail.	6	1	2
	b.	What are the basic reasons for considering the replacement of an equipment. The cost of a bike is Rs 3000. The salvage value (resale value) and the running cost are given as under. Discuss the most economical replacement age of the bike.	10	1	3

Year	1	2	3	4	5	6	7
Running Cost	600	700	800	900	1000	1200	1500
Resale Value	2000	1333	1000	750	500	300	300

Unit-II					
4	a.	Explain the standard symbols (gates) used in the construction of fault tree analysis diagram.	8	2	2

	b.	Draw a fault tree diagram for over heating of an electric motor.	8	2	3
		OR			
5	a.	Draw fault tree analysis diagram of hydraulic system after reduction with Boolean algebra for the system shown in figure and top event for no flow into barrel E.  	8	2	3
	b.	What are the various steps in fault tree analysis? Elaborate.	8	2	2
		Unit-III			
6	a.	What are the benefits of preventive maintenance?	8	3	2
	b.	Give any four problems in an electric motor and provide the solution for it.	8	3	2
		OR			
7	a.	Write a short note on conditional based maintenance and predictive maintenance.	8	3	2
	b.	When and why a periodic inspection is needed?	8	3	3
		Unit-IV			
8	a.	What do you understand by industrial accidents and what are the various types of it?	6	4	2
	b.	What is Health and Safety provisions under Factories Act, 1948? Discuss about Section 11 Cleanliness, Section 18: Drinking Water and Section 38 Precautions in case of fire.	10	4	3
		OR			
9	a.	Can all extinguishers be used for any type of fire? If not, then explain various types of fire extinguishers.	8	4	3
	b.	What are the measures to be adapted for fire prevention?	8	4	2
		UNIT-V			
10	a.	What are the various methods of recovery? Explain each in detail.	8	5	2
	b.	What do you understand by reconditioning? How it differs from recovery? Also give the advantages of reconditioning.	8	5	2
		OR			
11	a.	What is retrofitting system? What are the need and benefits of it?	8	5	2
	b.	What is foundation? Write a short note on accuracy test and technological test for alignment of a machine.	8	5	2

Course Code: SOE-B-CSE303

O P JINDAL UNIVERSITY

B. Tech. III Semester Regular Examinations

OPERATING SYSTEM

(Offered to CE, ECE EEE & ME)

Time: 3 Hrs. **Max. Marks: 100**

Answer any one question from each unit

All questions carry equal marks

			M	CO	KL
Unit-I (20 marks)					
1	a.	Define Operating Systems and discuss its role from different perspectives.	10	CO1	KL1
	b.	Write short note on CPU scheduling criteria.	10	CO2	KL3
OR					
2	a.	List out different services of Operating Systems and explain each service.	10	CO1	KL1
	b.	Explain different types of CPU Schedulers. i) Preemptive and non-preemptive scheduling ii) I/O bound and CPU bound iii) Scheduler and dispatcher	10	CO3	KL2
Unit-II					
3	a.	Distinguish among following terminologies i) Multiprogramming systems ii) Multitasking Systems iii) Multiprocessor systems.	10	CO2	KL1
	b.	What is the difference between a preemptive and non-preemptive scheduling algorithm? Explain FCFS scheduling algorithm. Find the average turnaround time and average waiting time for the processes given in the table below. Process CPU burst time (in ms) P1: 24, P2: 3, P3: 3.	10	CO3	KL3
OR					
4	a.	What is distributed operating system? What are the advantages of distributed operating system?	10	CO4	KL3
	b.	Explain the concept of 'process'. also describe the contents of a process control block (PCB).	10	CO3	KL2
Unit-III					
5	a.	What are system calls? Explain different categories of system calls with example?	10	CO1	KL3
	b.	Describe necessary conditions for a deadlock situation to arise.	10	CO2	KL2
OR					
6	a.	Explain the distinguishing features of i). Real time system ii) Multiprocessor system.	10	CO4	KL2
	b.	Explain the methods for deadlock prevention.	10	CO2	KL2
Unit-IV					
7	a.	What is operating system? What are functions of operating system?	10	CO3	KL1
	b.	What is deadlock? Explain the necessary conditions for its occurrence.	10	CO2	KL1
OR					
8	a.	What do you mean by PCB? Where is it used? What are its contents?	10	CO1	KL1
	b.	What is fragmentation? Explain its types and disadvantages	10	CO1	KL1
UNIT-V					
9	a.	What is a process? Draw and explain process state diagram.	10	CO3	KL1
	b.	Differentiate between the following a) Paging and Segmentation b) Page table and segment table.	10	CO3	KL2
OR					
10	a.	Explain three requirements that a solution to critical–section problem must satisfy.	10	CO4	KL2
	b.	Explain paging scheme of memory management. What hardware support is needed for its implementation?	10	CO1	KL2