IV B.Tech. I Semester Supplementary Examinations May 2016
Automobile Engineering
(Mechanical Engineering)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　　**Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1.	a)	Differentiate between petrol and diesel engines.	4M
	b)	Explain the concept of four wheel drive with a neat diagram.	10M
2.	a)	With the help of neat sketch explain the working of electrical fuel pump.	7M
	b)	Describe with a schematic diagram, the electronic petrol injection system.	7M
3.	a)	Write the functions of thermostat and antifreeze solutions.	5M
	b)	Describe with a neat diagram the electronic ignition system using contact breaker.	9M
4.		Explain the various pollution control techniques for the reduction of diesel engine emissions.	14M
5.	a)	Explain the working of standard Bendix drive.	7M
	b)	Describe the mechanism of solenoid switch.	7M
6.	a)	What are the requirements of automobile clutches?	4M
	b)	Explain the working of single plate clutch with the help of a simple sketch.	10M
7.	a)	What do you understand from the terms: oversteer and understeer?	4M
	b)	Discuss in detail the Ackermann steering mechanism.	10M
8.		Write the classifications of brakes. Describe the construction and working of drum type mechanical brake.	14M

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Hall Ticket Number :

1. a) How various automated production systems are classified? Explain about them in detail.   8M

    b) Describe about various elements of automation   6M

2. a) Describe the main functions that are utilized to control the operation of an automatic transfer system.   7M

    b) Classify and explain about the general methods of transporting work pieces on flow lines.   7M

3. a) Describe about various methods of line balancing.   7M

    b) Enumerate about various assembly systems based on physical configuration.   7M

4. a) Briefly explain the different types of robots   4M

    b) Describe the types of joints used in robots   10M

5.   Derive the forward and reverse transformation of 2-Degree of freedom and 3-degree of freedom arm.   14M

6.   Define Trajectory Planning and discuss how it is done in case of a robot having modified constant velocity motion.   14M

7. a) Explain Pneumatic actuators system with neat sketch   7M

    b) Explain the working of a stepper motor.   7M

8.   Describe the working and implementation of robot in spot and continuous arc welding process.   14M

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IV B.Tech. I Semester Supplementary Examinations May 2016
Advanced Manufacturing Systems
(Mechanical Engineering)

Max. Marks: 70   Time: 03 Hours

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1. a) What are the principles manufacturing systems?   7M

   b) What are the limitations of traditional manufacturing systems?   7M

2. a) What is production flow analysis? Explain how production flow analysis is done in identifying the part families?   7M

   b) What are the characteristics of Group technology?   7M

3. a) What is inventory control? Explain order point inventory system.   7M

   b) The annual demand for a certain item made-to-stock = 15000pc/year. One unit of the item cost Rs. 20.00 and the holding cost rate = 18%/year. Setup time to produce a batch = 6Hrs.The cost of equipment downtime plus labour = Rs.150/hr. Determine the economic order quantity and the total inventory cost for this case.   7M

4. a) Explain the construction of probe in CMM with neat sketches.   7M

   b) Classify the types of simulation in manufacturing.   7M

5. a) What are the types of FMS in manufacturing? Explain   7M

   b) What are the components of FMS? Explain.   7M

6. a) What are the different types of material handling equipment's used in FMS?   7M

   b) Explain the computer control system in FMS.   7M

7. a) Explain the structure of flexible assembly systems.   7M

   b) What is the role of robots in FMS?   7M

8. a) Explain why expert system is required in FMS?   7M

   b) What is LISP? How it is distinct from PROLOG?   7M

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R-11

Code : 1G578

IV B.Tech. I Semester Supplementary Examinations May 2016
Un Conventional Machining Process
(Mechanical Engineering)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1.	a)	Explain in brief the necessary for development for unconventional machining methods.	7M
	b)	Explain in detail how the unconventional machining processes are classified.	7M
2.		Discuss the hypothesis proposed by Shaw regarding the mode of material removal rate in ultrasonic machining and obtain an expression for machining rate. What are the assumptions on which this expression is based?	14M
3.	a)	Discuss the effects of the following parameters on working accuracy and rate of metal removal in abrasive jet machining (i) Jet velocity (ii) Standoff distance	7M
	b)	Discuss the importance of various equipment used in water jet machining.	7M
4.	a)	What is the principle involved in electrochemical machining? What are the materials commonly used for making a tool for used in this method?	7M
	b)	What are the functions of electrolyte in ECM process? Discuss the advantages and limitations of some electrolytes.	7M
5.	a)	Discuss the advantages of EDM as compared to other non traditional methods with regard to (i) meal removal rate (ii) surface finish and (iii) accuracy	7M
	b)	Discuss the properties required for a dielectric fluid to be used in the EDM process.	7M
6.	a)	Make a comparison between laser beam and electron beam machining processes based on their applications and limitations.	6M
	b)	What are the differences between thermal and non-thermal processes in EBM?	8M
7.	a)	Explain what is meant by non-transferred and transferred mode of plasma arc. What are the advantages of each?	8M
	b)	Discuss different types of resists used in chemical machining process.	6M
8.	a)	Using a sketch to illustrate your answer, describe the Selective Laser Sintering (SLS) process.	7M
	b)	Explain the working principle of Electro Stream Drilling. In what respect it is different from ECM?	7M

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Code : 1G573

R-11

IV B.Tech. I Semester Supplementary Examinations May 2016
Finite Element Methods
(Mechanical Engineering)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Determine the displacements of the nodes of the spring system Shown in the Fig.1. if, K_1 = 40 N/mm, K_2 = 50 N/mm, K_3 = 60 N/mm, K_4 = 80 N/mm, F_1 = 100 N and F_2 = 150 N. [6M]
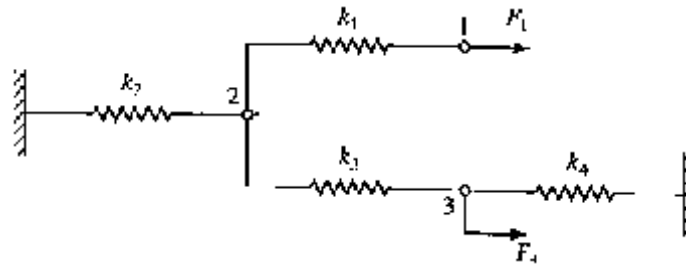
Fig. 1   10M

   b) List out various advantages, disadvantages and limitations of Finite Element Method   4M

2. Consider the bar loaded as shown in the Fig.2. Determine the nodal displacements, element stresses, and support reactions. E= 200 GPa.
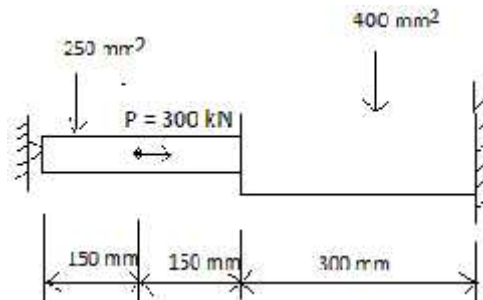

Fig. 2   14M

3. The plane truss shown in Figure 3 having modulus of elasticity *E* = 105 GPa. Find
   a. Assemble the global stiffness matrix.
   b. Compute the nodal displacements in the global coordinate system for the loads shown.
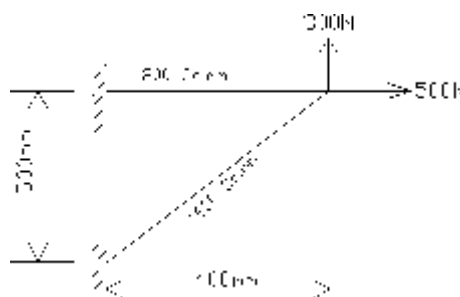   c. Compute the axial stress in each element.

Fig. 3

14M

4. Three span beam is loaded as shown in the Fig. 4. Determine the support reactions and deflection at the mid span. Take E = 2X10^{11} pa and I = 1.27x10^{-4} m^4.

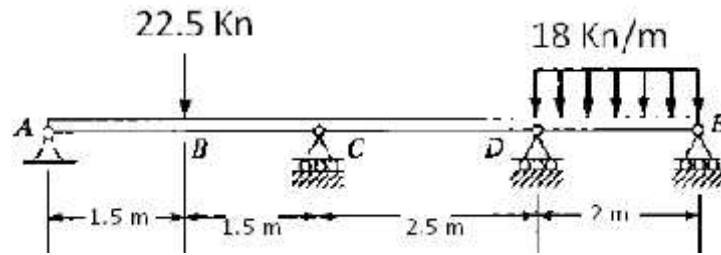Fig. 4   14M

5. A Two dimensional plate is shown in the Fig. 5. Determine the equivalent point loads at nodes 7,8,9for the linearly distributed pressure load acting on the edge 7–8–9
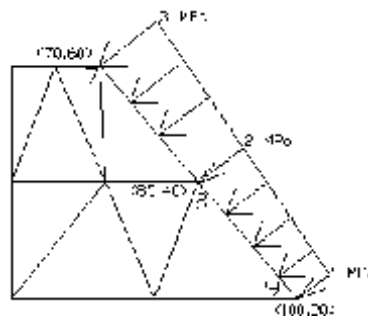

Fig. 5   14M

6. Derive the element stiffness matrix for a 4–noded quadrilateral iso parametric element   14M

7. A composite wall consists of three materials, as shown in the Fig. 6. The outer temperature is T$_0$ = 20^0 C. Convection heat transfer takes place on the inner surface of the wall with T_∞=800^{0}C and h=25W/m^2.^{o}C. Determine the temperature distribution, if K$_1$ = 20 W/m ^{o}C, K$_2$ = 30 W/m ^{o}C, K$_3$ = 50 W/m ^{o}C.
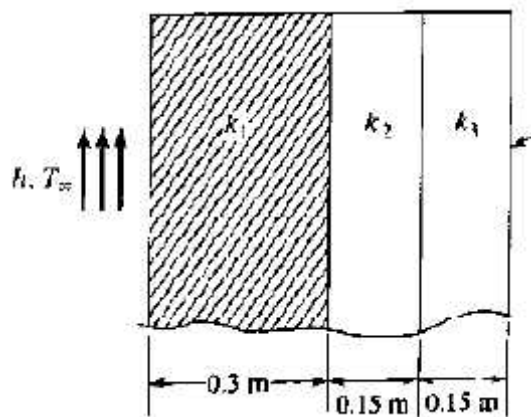

Fig. 6   14M

8. Determine the lowest Eigen value and corresponding mode for the beam shown in the Fig.7. Take E = 200GPa,   = 7840kg/m^3, I = 2000mm^4, A = 240mm^2.
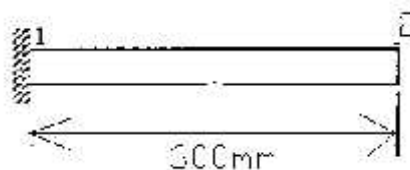

Fig. 7   14M

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