


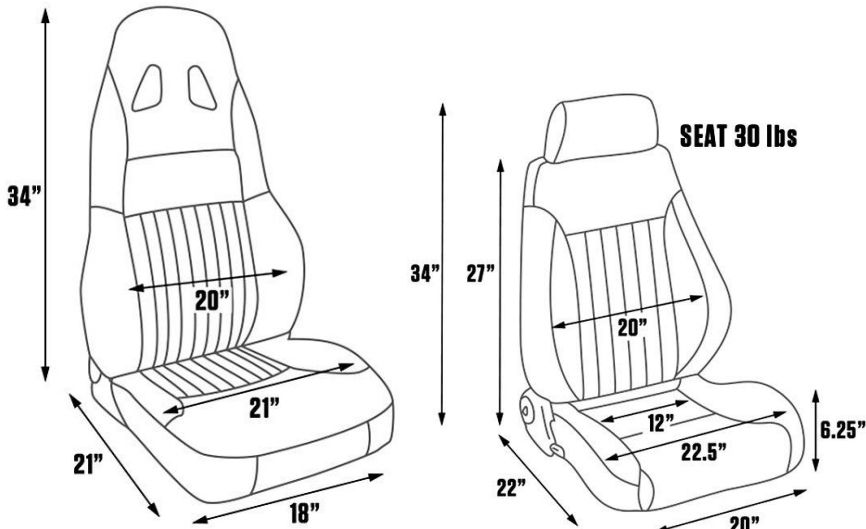
Name: Enrolment No:	
--------------------------------------	--

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Course: Semester: II
Program: M.Tech. Advanced Vehicles **Time : 03 hrs.**
Course Code: Vehicle Integration and Ergonomics(MEAV7014P) **Max. Marks: 100**

Instructions: All the questions are compulsory and assume any missing data.

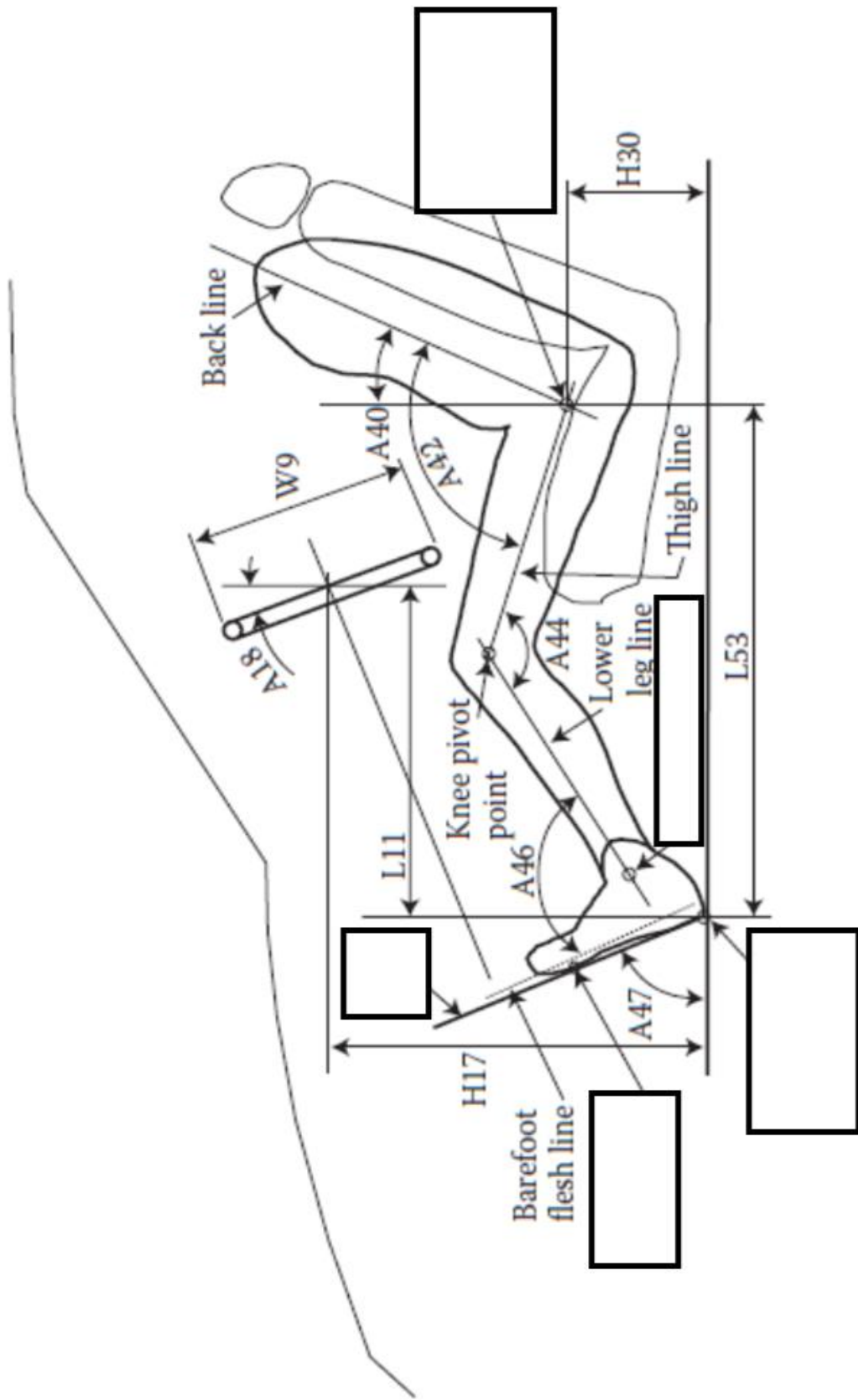
SECTION A
(5Qx4M=20Marks)

S. No.	Question	Ma rks	CO
Q 1	What do you understand by anthropometry and how it is applied in the field of engineering?	4	CO1
Q 2	Define Vehicle packaging ?	4	CO3
Q 3	Describe the working principle of an ESP.	4	CO4
Q 4	Identify what percentile of population is considered to design the following seats? (Please refer the anthropometry sheet attached at page no. 5) <div style="text-align: center; margin-top: 20px;">  </div>	4	CO2
Q 5	Fill the occupant packaging nomenclature in the boxes shown in figure on page no. 4. (Please attach the page)	4	CO3

SECTION B
(4Qx10M= 40 Marks)

Q 6	Discuss the mechanism of independent suspension system along with its focused application area.	10	CO4
-----	---	----	-----

Q 7	Differentiate between electrically coupled and mechanically coupled hybrid vehicles.	10	CO2
Q 8	Discuss the functioning of power brake with a schematic diagram. OR Discuss the structural difference between the mechanical and hydraulic drum brake.	10	CO4
Q 9	Discuss and plot the architectural layout of an infotainment system.	10	CO2
SECTION-C (2Qx20M=40 Marks)			
Q 10	Discuss and analyze any two integrations of steering mechanism. OR Discuss and analyze the two steering mechanism which uses drop arm instead of rack.	20	CO4
Q 11	Discuss and analyze all the integrations in vehicle electrical and electronic architecture.	20	CO4



Static Body Dimensions of United States Adults (Values Are in Millimeters)

No.	Measurement	Gender	5th	50th	95th	Std. Dev.
1	Stature: vertical distance from the floor to the vertex	Male	1647	1756	1855	67
		Female	1415	1516	1621	63
2	Stature: vertical distance from the floor to the vertex	Male	1640	1755	1870	71
		Female	1520	1625	1730	64
3	Stature: vertical distance from the floor to the vertex	Male	1670	1790	1900	70
		Female	1540	1650	1760	67
4	Stature: vertical distance from the floor to the vertex	Male	1636	1763	1887	76
		Female	1507	1622	1731	68
5	Stature: vertical distance from the floor to the vertex	Male	1665	1756	1880	62
		Female	1572	1643	1708	64
6	Eye height: vertical distance from the floor to the eyes	Male	1528	1634	1743	66
		Female	1415	1516	1621	62
7	Shoulder height: vertical distance from the floor to the acromion	Male	1342	1442	1546	62
		Female	1241	1334	1432	58
8	Elbow height: vertical distance from the floor to the radiale	Male	995	1072	1153	48
		Female	926	998	1074	45
9	Wrist height: vertical distance from the floor to the wrist	Male	778	846	915	41
		Female	728	790	855	39
10	Sitting height: vertical distance from the sitting surface to the vertex	Male	854	914	972	36
		Female	795	852	910	25
11	Sitting height: vertical distance from the sitting surface to the vertex	Male	855	915	975	36
		Female	800	860	920	36
12	Sitting eye height: vertical distance from the sitting surface to the eyes	Male	735	792	848	34
		Female	685	739	794	33
13	Sitting eye height: vertical distance from the sitting surface to the eyes	Male	749	811	863	38
		Female	736	761	849	41
14	Sitting shoulder height: vertical distance from the sitting surface to the acromion	Male	548	598	646	30
		Female	509	555	604	29
No.	Measurement	Gender	5th	50th	95th	Std. Dev.
15	Sitting elbow height: vertical distance from the sitting surface to the underside of the elbow	Male	184	232	274	27
		Female	176	220	264	27
16	Thigh height: vertical distance from the sitting surface to highest top of thigh surface	Male	149	168	190	13
		Female	140	159	180	12
17	Seated stomach depth: horizontal depth of trunk at the level of abdominal extension	Male	229	299	374	45
		Female	195	247	309	48
18	Knee height (sitting): vertical distance from the floor to the upper surface of the knee	Male	514	559	606	28
		Female	474	515	560	26
19	Popliteal height (sitting): vertical distance from the floor to the underside of the knee	Male	395	434	476	25
		Female	351	389	429	24
20	Forward thumb tip reach: horizontal distance from the back of the shoulder blade to thumb tip with arm raised at shoulder level	Male	739	801	867	39
		Female	677	735	797	36
21	Buttock-to-knee distance (sitting): horizontal distance from the back of uncompressed buttock to the front of the kneecap	Male	596	616	667	30
		Female	542	589	640	30
22	Buttock-to-popliteal distance (sitting): horizontal distance from the back of uncompressed buttock to the back of the knee	Male	458	500	545	27
		Female	440	482	528	27
23	Elbow-to-fingertip distance: horizontal distance from the back of the elbow to middle-finger tip with lower arm horizontal in sitting position	Male	448	484	524	23
		Female	406	443	482	23
24	Forearm-to-forearm breadth: horizontal distance between the outermost points on the forearms in sitting position	Male	474	546	620	44
		Female	415	468	528	35
25	Hip breadth (sitting): maximum horizontal distance across the hips in the sitting position	Male	329	367	412	25
		Female	342	384	432	27
26	Foot length: distance from the back of the heel to the tip on the longest toe measured in longitudinal (forward) axis	Male	249	270	292	13
		Female	224	244	264	12
27	Shoe length: distance from back of heel to front edge of sole	Male	277	299	319	13
		Female	241	264	286	15
28	Foot breadth: maximum horizontal breadth across the foot perpendicular to the longitudinal axis	Male	92	101	109	53
		Female	82	90	98	49
29	Shoe breadth: maximum breadth of shoe at outside edges of sole	Male	98	107	116	11