

PERKARA : KADAR PERKHIDMATAN YANG DITAWARKAN OLEH FAKULTI
KEJURUTERAAN, UNIVERSITI PUTRA MALAYSIA

KEPUTUSAN : BIL. 4 (2019) 30 OGOS 2019

JAWATANKUASA TETAP
KEWANGAN (JKTK)

MINIT : MINIT 6/4 2019)

JABATAN KEJURUTERAAN AEROANGKASA (KAA)

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Unit	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
1	Fire testing	Per Sample	240 - 310	320 - 420	400 - 520
2	Optical microscopy with Image Analysis software	Per Sample	220 - 290	290 - 380	360 - 470
3	Ultrasonic homogenizer for nanofillers dispersion	Per Sample	170 - 220	220 - 290	280 - 360
4	Vacuum furnace	Per Hour	230 - 300	310- 400	390 - 510
5	Vacuum infusion	Per Sample	250 - 330	330 - 430	410 - 530
6	Vacuum oven	Per Hour	230 -300	300 - 390	380 - 490
7	Water absorption test (Waterbath)	Per Sample	240 - 310	320 - 420	400 - 520
8	Fatigue Testing (ISO/IEC 17025)	Per Hour	190 - 250	250 - 330	310 - 400
9	Crop monitoring and maintenance using UAV	Per Acre	640 - 830	850 - 1,110	1,060 - 1,380
10	Photo and video shooting for events using UAV	Per Hour	80 - 100	110 - 140	140 - 180
11	Construction site monitoring using UAV	Per Hour	80 - 100	110 - 140	140 - 180
12	3D Printer (Tanpa Filamen)	Per Hour	180 - 230	240 - 310	300 - 390
13	Sewaan Makmal Komputer	Per Hour	320 - 420	430 - 560	540 - 700
14	Open Loop Wind Tunnel, OLWT (Speed: 35 m/s , Test section size: 1m x1m x 2.5m)	Per Hour	1,370 - 1,780	1,820 - 2,370	2,280 - 2,960
15	Closed Loop Wind Tunnel, CLWT (Speed: 50 m/s, Test section size: 1m x 1m x 3m)	Per Hour	1,400 - 1,820	1,870 - 2,430	2,340 - 3,040
16	Open Jet Wind Tunnel, OJWT (Speed: 7 m/s, Test section diameter: 2m)	Per Hour	1,370 - 1,780	1,820 - 2,370	2,280 - 2,960
17	Six Component Balance System	Per Hour	1,400 - 1,820	1,870 - 2,430	2,340 - 3,040
18	Hampden Wind Tunnel (Speed: 18 m/s, Test section size: 20cm x 20cm x 60m)	Per Hour	700 - 910	930 - 1,210	1,160 - 1,510
19	Air Flow Bench With Smoke Visualization (Speed: 20 m/s, Test section size: 6.5cm x 24.5cm x 72.5m)	Per Hour	700 - 910	930 - 1,210	1,160 - 1,510

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Unit	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
20	Smoke Generator Machine (Fog Machine)	Per Hour	700 - 910	930 - 1,210	1,160 - 1,510
21	Particle Image Velocimetry (PIV) System	Per Hour	1,380 - 1,790	1,840 - 2,390	2,300 - 2,990
22	Digital High Speed Video Camera	Per Sample	140 - 180	190 - 250	240 - 310
23	Single Stage Compressed Gas Gun	Per Sample	140 - 180	190 - 250	240 - 310

JABATAN KEJURUTERAAN AWAM (KAW)

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Unit	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
1	Steel tensile test 1,000kN Diameter \leq 20mm	Per Sample	100 - 130	110 - 140	120 - 160
2	Steel tensile test 1,000kN Diameter 25mm	Per Sample	150 - 200	170 - 220	180 - 230
3	Steel tensile test 1,000kN Diameter 28mm	Per Sample	190 - 210	210 - 230	230 - 250
4	Steel tensile test 1,000kN Diameter 30mm	Per Sample	220 - 240	240 - 260	260 - 290
5	Steel tensile test 1,000kN Diameter 40mm	Per Sample	280 - 310	310 - 340	340 - 370
6	Flexural Test Saiz 100x100x500mm (3 points)	Per Sample	50 - 70	60 - 80	80 - 100
7	Flexural Test Saiz 150x150x750mm (3 points)	Per Sample	50 - 70	60 - 80	80 - 100
8	Splitting Tensile Test on Cylinder Saiz 100x200mm	Per Sample	40 - 50	50 - 70	70 - 90
9	LVDT	Per Day	120 - 160	160 - 210	200 - 260
10	Data Logger	Per Day	530 - 690	700 - 910	880 - 1,140
11	Hydraulic Jack System 30 tonne	Per Day	170 - 220	220 - 290	280 - 360
12	Hydraulic Jack System 50 tonne	Per Day	180 - 230	240 - 310	300 - 390
13	Hydraulic Jack System 100 tonne	Per Day	180 - 230	240 - 310	300 - 390
14	Hydraulic Jack System 150 tonne	Per Day	190 - 250	260 - 340	320 - 420
15	Actuator (Shimadzu) Maksimum 300 kN-static	Per Sample	1,510 - 1,960	2020 - 2,630	2,520 - 3,280
16	Actuator (Shimadzu) Maksimum 300 kN-dynamic	Per Sample Per Day	1,510 - 1,960	2020 - 2,630	2,520 - 3,280
17	Actuator (MTS) Maksimum 500 kN-static	Per Sample	1,700 - 2,210	2,270 - 2,950	2,840 - 3,690
18	Actuator (MTS) Maksimum 300 kN-dynamic	Per Sample Per Day	1,700 - 2,210	2,270 - 2,950	2,840 - 3,690
19	1,000 kN Frame	Per Day	250 - 330	340 - 440	420 - 550
20	250 kN Frame	Per Day	120 - 160	160 - 210	200 - 260
21	1,000 kN Load Cell	Per Day	110 - 140	140 - 180	180 - 230
22	500 kN Load Cell	Per Day	110 - 140	140 - 180	180 - 230

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Unit	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
23	50 kN Load Cell 2	Per Day	80 - 100	110 - 140	140 - 180
24	Cement Test - Cube Compressive Strength	Per Test	20 - 25	25 - 35	30 - 40
25	Cement Test - Cement Hydration by Isothermal Calorimetry	Per Test	90 - 115	120 - 155	150 - 195
26	Grinding of material (up to 6 kg/hr) About 900 rotation for an hour	Per Sample	125 - 165	170 - 220	210 - 275
27	Vacuum Desiccator	Per Sample	10 - 15	15 - 20	20 - 25
28	Oven-dried/burning using furnace	Per Sample	125 - 165	170 - 220	210 - 275
29	Initial Rate of Absorption Test	Per Sample	45 - 60	60 - 80	75 - 100
30	Water Penetration test	Per Sample	30 - 40	40 - 50	50 - 65
31	Concrete Non Destructive Test - Rebound Hammer (Sampel Size: 150x150x150mm)	Per Method	20 - 25	25 - 35	30 - 40
32	Rapid Chloride Permeability Test	Per Sample	55 - 70	70 - 90	90 - 115
33	Modulus of Elasticity	Per Sample	100 - 130	135 - 175	170 - 220
34	Concrete Mixer – Mortar/Concrete	Per Day	125 - 165	170 - 220	210 - 275
35	Concrete Mixer – Cement/Mortar	Per Day	100 - 130	135 - 175	170 - 220
36	Mould (100 mm cube)	Per Day	10 - 15	15 - 20	20 - 25
37	Set of Sieve Tray	Per Day	40 - 50	55 - 70	70 - 90
38	Slump Apparatus	Per Day	25 - 35	30 - 40	40 - 50
39	Compacting Factor Apparatus	Per Day	25 - 35	30 - 40	40 - 50
40	Flow Table Apparatus	Per Day	35 - 45	50 - 65	60 - 80
41	Coring Machine	Per Day	90 - 115	120 - 155	150 - 195
42	Splitter Machine	Per Day	90 - 115	120 - 155	150 - 195
43	J-Ring Apparatus	Per Day	35 - 45	50 - 65	60 - 80
44	V-Funnel Apparatus	Per Day	35 - 45	50 - 65	60 - 80
45	L-box Flowability Apparatus	Per Day	35 - 45	50 - 65	60 - 80
46	Concrete Compression Test (Concrete cube 50mm, 100mm, 150mm) Gred <40	Per Sample	10 - 15	15 - 20	20 - 25
47	Concrete Compression Test (Concrete cube 50mm, 100mm, 150mm) Gred >40	Per Sample	20 - 25	25 - 35	30 - 40
48	Cylinder Concrete Compression Test (100mm x 200mm)	Per Sample	30 - 40	40 - 50	50 - 65
49	Cylinder Concrete Compression Test (150mm x 300mm)	Per Sample	40 - 50	55 - 70	70 - 90
50	Splitting Tensile Test on Cylinder	Per Sample	40 - 50	55 - 70	70 - 90
51	Carbonation Test (Size: 100x100x500mm)	Per Sample	55 - 70	70 - 90	90 - 115
52	Carbonation Test (Size: 100x100x100mm)	Per Sample	40 - 50	55 - 70	70 - 90

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Unit	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
53	Concrete Non Destructive Test - Ultrasonic Pulse Velocity (Sampel size: 150x150x150mm)	Per Method	20 - 25	25 - 35	30 - 40
54	Masonry Test - Compressive Strength of Bricks/Blocks	Per Test (set of 10 samples)	20 - 25	25 - 35	30 - 40
55	Cement Test - Mortar Compressive Strength	Per Test	20 - 25	25 - 35	30 - 40
56	Cement Test - Flow test (mixing and testing)	Per Test	90 - 115	120 - 155	150 - 195
57	Cement Test - Standard Consistency and Setting Time	Per Test	90 - 115	120 - 155	150 - 195
58	Aggregate Test - Sieve Analysis	Per Test	85 - 110	110 - 145	140 - 180
59	Aggregate Test - Water Absorption and Specific Gravity	Per Test	60 - 80	80 - 105	100 - 130
60	Concrete Mixing & Fresh Properties Test (Slump & Compacting Factor Tests)	Per mixing	1,265 - 1,645	1,690 - 2,195	2,110 - 2,745
61	Wave Flume and Wave Generation System	Per Day	910 - 1,185	1,215 - 1,580	1,520 - 1,975
62	Big Open Channel Flume	Per Day	530 - 690	705 - 915	880 - 1,145
63	Small Open Channel Flume	Per Day	385 - 500	520 - 665	640 - 830
64	Teaching Flume	Per Day	145 - 190	190 - 245	240 - 310
65	3D Velocity meter	Per Day	200 - 260	265 - 345	330 - 430
66	Current meter	Per Day	125 - 165	170 - 220	210 - 275
67	Pressure Transducer	Per Day	220 - 285	295 - 385	370 - 480
68	Pump	Per Day	80 - 105	105 - 135	130 - 170
69	Hydraulic Bench	Per Day	175 - 230	230 - 300	290 - 375
70	Pipe Network Apparatus	Per Day	125 - 165	170 - 220	210 - 275
71	Flow Meter	Per Day	95 - 125	130 - 170	160 - 210
72	Total solids	Per Sample	100 - 130	135 - 175	170 - 220
73	Total suspended solids	Per Sample	100 - 130	135 - 175	170 - 220
74	Volatile suspended solids	Per Sample	155 - 200	210 - 275	260 - 340
75	Total Ammonia Nitrogen (ammonia + ammonium)	Per Sample	205 - 265	270 - 350	340 - 440
76	BOD	Per Sample	150 - 195	200 - 260	250 - 325
77	COD	Per Sample	145 - 190	190 - 245	240 - 310
78	Oil and grease	Per Sample	110 - 145	145 - 190	180 - 235
79	Water hardness	Per Sample	170 - 220	225 - 295	280 - 365
80	Zinc	Per Sample	190 - 245	255 - 330	320 - 415
81	Manganese	Per Sample	190 - 245	255 - 330	320 - 415

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Unit	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
82	Ferum	Per Sample	190 - 245	255 - 330	320 - 415
83	Microbiological test: Agar plate	Per Sample	210 - 275	280 - 365	350 - 455
84	Total Phosphorus	Per Sample	190 - 245	255 - 330	320 - 415
85	Water bath	Per Day	40 - 50	55 - 70	70 - 90
86	Analytical balance	Per Day	30 - 40	40 - 50	50 - 65
87	Oven	Per Day	160 - 210	215 - 280	270 - 350
88	Furnace (Max 1000°C)	Per Hour	215 - 280	290 - 375	360 - 470
89	Aerator oxygen Air Pump (per day)	Per Day	125 - 165	170 - 220	210 - 275
90	Digital Laser Gun	Per Day	140 - 180	185 - 240	230 - 300
91	Thermal Performance using hot box method (tidak termasuk data logger) Saiz panel: 500 mm x 500 mm	Per Sample	230 - 300	305 - 400	380 - 500

JABATAN KEJURUTERAAN BIOLOGI DAN PERTANIAN (KBP)

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
1	Ujian Geofizik	Per line (1 line = 400m)	3,500 - 4,550	3,850 - 5,000	4,200 - 5,500
2	Ujian Pengepaman telaga tiub (tube well pumping test)	Per Sample	7,000 - 9,100	7,700 - 10,000	8,400 - 10,900
3	Permodelan air bawah tanah (Visual Modflow)	Per Model	8,000 - 10,400	8,800 - 11,400	9,600 - 12,500
4	Sewaan traktor John Deere (105 hp) untuk menarik sebarang implemen berikut: - Trailer 3 Tan - Bajak putar - Bajak piring - Mesin penanam jagung	Per Hour (max: 8 hours)	60 - 80	80 - 100	100 - 130
5	Penentuan Kualiti Air (TDS) in-situ seperti suhu, salinity, ammonia, Pepejal terlarut (TDS)	Per Sample	70 - 90	75 - 100	85 - 110
6	Penentuan COD	Per Sample	100 - 130	130 - 170	160 - 210
7	Penentuan BOD	Per Sample	80 - 105	100 - 130	130 - 170
8	Penentuan jumlah pepejal (MLSS)	Per Sample	10 - 15	15 - 20	20 - 25
9	Faro Laser Scanner	Per Day	1,190 - 1,545	1,310 - 1,700	1,430 - 1,860
10	RTK Trimble R6	Per Day	790 - 1,025	870 - 1,130	950 - 1,235

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
11	GPS Juno Trimble	Per Day	10 - 15	15 - 20	20 - 25
12	FLIR Thermal Camera	Per Day	280 - 360	370 - 480	460 - 600
13	Calorimetric Fuel testing equipment	Per Sample	70 - 90	90 - 120	110 - 140
14	HP4000CG-UV-NIR Ocean optics spectrometer	Per Sample	70 - 90	90 - 120	110 - 140
15	FTNIR Perkin Elmer Spectrum 100N	Per Sample	80 - 100	110 - 140	140 - 180
16	Instron 5565 Universal Testing Machine	Per Sample	80 - 100	110 - 140	140 - 180
17	350 cm x 250 cm walk-in cold room	Per Day	10 - 15	15 - 20	20 - 25
18	Disc milling (GSF-200)	Per Sample (kg)	10 - 15	15 - 20	20 - 25
19	Husker	Per Sample (kg)	10 - 15	15 - 20	20 - 25
20	Manual lathe machine	Per Sample	120 - 155	160 - 210	200 - 260
21	Manual mill machine	Per Sample	120 - 155	160 - 210	200 - 260

JABATAN KEJURUTERAAN ELEKTRIK DAN ELEKTRONIK (KEE)

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
1	HIOKI Power Quality Analyzer	Per Day	85 - 110	110 - 145	140 - 180
2	Fluke Power Quality Analyzer	Per Day	140 - 180	190 - 250	240 - 310
3	Heat Distribution Measurement & Report	Per Sample	1,180 - 1,530	1,570 - 2,040	1,960 - 2,550
4	Fluke Thermal Imager	Per Day	100 - 130	130 - 170	160 - 210
5	HIOKI Power Quality Analyzer - On-site power quality measurement	Point Per Day	815 - 1,060	1,090 - 1,415	1,360 - 1,770
6	Fluke Power Quality Analyzer - On-site power quality measurement	Point Per Day	800 - 1,040	1,070 - 1,390	1,340 - 1,740
7	Power Quality Result, Analysis & Report	Per Day	1,340 - 1,740	1,790 - 2,330	2,240 - 2,910
8	High Speed Camera	Per Sample	360 - 470	480 - 620	600 - 780
9	HV Equipment - AC/DC/Impulse Testing	Per Sample	620 - 810	830 - 1,080	1,040 - 1,350
10	HV Equipment - Oil Testing	Per Sample	110 - 140	140 - 180	180 - 230
11	PCB Fabrication using FR4 board including drilling, brushing and drying	Per Sample	530 - 690	700 - 910	880 - 1,140

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
12	Circuit artwork printing using Accublack Film & Dry Film Photoresist	Per Sample	130 - 170	180 - 230	220 - 290
13	Entrance Charges for Cleanroom	Per Entry	100 - 130	140 - 180	170 - 220
14	Spin Coater - To deposit photoresist on the substrate	Per Sample	70 - 90	90 - 120	110 - 140
15	Laminator - To deposit dry photoresist on the substrate	Per Sample	90 - 120	120 - 160	150 - 200
16	Programmable Oven - For heating, curing and drying material	Per Sample	110 - 140	140 - 180	180 - 230
17	UV Light box - For lithography process	Per Sample	50 - 70	60 - 80	80 - 100
18	Wire bonding	Per Sample	140 - 180	180 - 230	230 - 300
19	Sputter Coater for gold target	Per Sample	90 - 120	120 - 160	150 - 200
20	Sputter Coater for platinum target	Per Sample	100 - 130	140 - 180	170 - 220
21	Current-Voltage measurement	Per Sample	260 - 340		

JABATAN KEJURUTERAAN KOMPUTER DAN KOMUNIKASI (KKK)

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
1	Taper Fiber (Vytran GPX-3400)	Per Sample	180 - 230	240 - 310	300 - 390
2	MFC Gas System (Fume Cupboard)	Per Day	150 - 200	210 - 270	260 - 340
3	VPI Transmission Maker Software	Per Day	160 - 210	210 - 270	260 - 340
4	LeCroy Oscilloscope WaveMaster380Zi (30 GHz)	Per Day	410 - 530	540 - 700	680 - 880
5	Milimeter Wave Synthesizer R&S SMR60 (60GHz)	Per Day	230 - 300	310 - 400	380 - 490
6	Pulse Function Arbitrary Noise Generator	Per Day	110 - 140	140 - 180	180 - 230
7	Mixed System Measurement System	Per Day	110 - 140	140 - 180	180 - 230
8	C+L Band ASE Light Source (ALS-CL-17-B-SC)	Per Day	110 - 140	140 - 230	180 - 230
9	Digital Phosphor Oscilloscope Tektronix TDS3012C	Per Day	100 - 130	130 - 170	160 - 210
10	Optical Spectrum Analyzer Yokogawa AQ6375/AQ6373 (350-2400nm)	Per Day	240 - 310	320 - 420	400 - 520
11	Optical Spectrum Analyzer Yokogawa AQ6317B	Per Day	240 - 310	320 - 420	400 - 520

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
12	Optical Spectrum Analyzer Yokogawa AQ6370B (600-1700nm)	Per Day	240 - 310	320 - 420	400 - 520
13	Optical Time-Domain Reflectometer (OTDR)	Per Day	140 - 180	190 - 250	230 - 300

JABATAN KEJURUTERAAN MEKANIKAL DAN PEMBUATAN (KMP)

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
1	Static Testing - Tensile Testing/ Compression Testing/ Flextural Testing/ Bending Testing (<10kN)	Per Specimen	35 - 45	50 - 65	60 - 80
2	Static Testing - Tensile Testing/ Compression Testing/ Flextural Testing/ Bending Testing (10 hingga 50kN)	Per Specimen	95 - 125	130 - 170	160 - 210
3	Static Testing - Tensile Testing/ Compression Testing/ Flextural Testing/ Bending Testing (> 50kN)	Per Specimen	120 - 155	160 - 210	200 - 260
4	Creep test (< 10kN)	Per Specimen	50 - 65	65 - 85	80 - 105
5	Creep test (10 hingga 50kN)	Per Specimen	155 - 200	210 - 275	260 - 340
6	Creep test (> 50kN)	Per Specimen	175 - 230	230 - 300	290 - 375
7	Tensile Test report for MS ISO IEC17025	Per Report	1,000	1,000	1,000
8	Powder compaction (< 10kN)	Per Specimen	60 - 80	80 - 105	100 - 130
9	Powder compaction (10 hingga 50kN)	Per Specimen	140 - 180	185 - 240	230 - 300
10	Powder compaction (> 50kN)	Per Specimen	175 - 230	230 - 300	290 - 375
11	Dynamic Testing (0 - 12 jam)	Per Specimen	55 - 70	70 - 90	90 - 115
12	Dynamic Testing (13 - 24 jam)	Per Specimen	130 - 170	175 - 230	220 - 285
13	Dynamic Testing (24 - 48 jam)	Per Specimen	220 - 285	295 - 385	370 - 480
14	Dynamic Testing (49 - 72 jam)	Per Specimen	335 - 435	450 - 585	560 - 730
15	Dynamic Testing (73 - 96 jam)	Per Specimen	340 - 440	455 - 590	565 - 735
16	Dynamic Testing (97 - 120 jam)	Per Specimen	445 - 580	590 - 765	740 - 960
17	Dynamic Testing (121 - 144 jam)	Per Specimen	560 - 730	740 - 960	930 - 1,210

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
18	Dynamic Testing (145 - 168 jam)	Per Specimen	670 - 870	900 - 1,170	1,120 - 1,460
19	Hardness (MicroVickers & Rockwell)	Per Sample	20 - 25	25 - 35	30 - 40
20	Furnace (up to 2000 Degree C)	Per Hour	95 - 125	130 - 170	160 - 170
21	Furnace (up to 1000 Degree C)	Per Hour	50 - 65	65 - 85	80 - 105
22	Precision Cutter Saw	Per Hour	95 -125	130 - 170	160 - 210
23	Rotary Grinding & Polishing	Per Hour	95 -125	130 - 170	160 - 210
24	Fume Hood	Per Hour	55 - 70	70 - 90	90 - 115
25	Optical Microscope	Per Hour	80 - 105	105 - 135	130 - 170
26	Welding (TIG, MIG, Arc)	Per Sample	95 - 125	130 - 170	160 - 210
27	Conventional Machining (Milling, Turning, Drilling, Grinding, Cutting)	Per Hour	95 - 125	130 - 170	160 - 210
28	Plastic Injection Molding	Per Hour	175 - 230	235 - 305	290 - 375
29	Vertical Band Saw	Per Usage	10 - 15	15 - 20	20 - 25
30	Induction Melting Furnace	Per Usage	560 - 730	745 - 970	930 - 1,210
31	CNC (Milling and Turning) - Programming of Part Program	Per Sample	245 - 320	330 - 430	410 - 535
32	CNC (Milling and Turning) - Machine Charge	Per Hour	245 - 320	330 - 430	410 - 535
33	PLC, Pneumatic & Electro-pneumatic	Per Day	1,520 - 1,975	2,025 - 2,635	2,530 - 3,290
34	3d Printer - by weight	Per Sample	1.60 - 2.00	2.20 - 2.80	2.80 - 3.60
35	3d Printer - rental	Per Hour	10 - 15	15 - 20	20 - 25
36	3d Printer Liquid	Per Gram	2.00 - 3.00	3.00 - 4.00	4.00 - 5.00
37	Oven	Per Hour	15 - 20	20 - 25	25 - 35
38	Vacuum Casting	Per Hour	70 - 90	95 - 125	120 - 155
39	Vacuum Casting	Per Gram	0.40 - 0.60	0.50 - 0.70	0.60 - 0.80
40	Vacuum Casting - sample preparation	Per Sample	2.00 - 3.00	3.00 - 4.00	4.00 - 5.00
41	PC & Software (ANSYS, ABAQUS, CATIA etc.)	Per Hour Per Client	20 - 30	30 - 40	40 - 50
42	CATIA Drawing	Per Drawing	130 - 170	180 - 230	220 - 290
43	Plotter - Poster printing A0 size (Glossy)	Per Drawing	80 - 100	110 - 140	140 - 180
44	Plotter - Poster printing A0 size (Simili)	Per Drawing	40 - 50	50 - 70	60 - 80
45	Plotter - Poster printing A1-A2 size (Glossy)	Per Drawing	30 - 40	40 - 50	50 - 70
46	Plotter - Poster printing A1-A2 size (Simili)	Per Drawing	20 - 30	30 - 40	40 - 50
47	Engine Test Bed (Petrol/Diesel)	Per Day	1,040 - 1,350	1,390 - 1,810	1,740 - 2,260
48	Engine Test Bed (Petrol/Diesel)	Per Sample	70 - 90	100 - 130	120 - 160
49	Bomb Calorimeter	Per Hour	80 - 100	110 - 140	140 - 180

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
50	Bomb Calorimeter	Per Sample	60 - 80	80 - 100	100 - 130
51	Viscometer	Per Sample	20 - 30	30 - 40	40 - 50
52	Shaker 800N	Per Hour	100 - 130	130 - 170	160 - 210
53	Shaker 18N dan 200N	Per Hour	60 - 80	80 - 100	100 - 130
54	Impact Hammer	Per Hour	40 - 50	50 - 70	60 - 80
55	Sound Level Meter	Per Hour	40 - 50	50 - 70	60 - 80
56	DAQ NI USB	Per Hour	40 - 50	50 - 70	60 - 80
57	LMS	Per Hour	40 - 50	50 - 70	60 - 80
58	ADASH	Per Hour	40 - 50	50 - 70	60 - 80
59	Surface Roughness	Per Sample	50 - 70	60 - 80	80 - 100
60	Profile Projector	Per Hour	20 - 30	30 - 40	40 - 50
61	Height Gauge	Per Hour	20 - 30	30 - 40	40 - 50
62	Balance Calibration (20g to 250g)	Per Sample	180 - 230	240 - 310	300 - 390
63	Balance Calibration (250g to 6.5kg)	Per Sample	180 - 230	240 - 310	300 - 390
64	Balance Calibration (6.501kg to 10kg)	Per Sample	340 - 440	450 - 590	560 - 730
65	Standard Calibration: XP56, Class: 1g-50g	Per Sample	20 - 30	30 - 40	40 - 50
66	Standard Calibration: AX2005, Class: 100g-1kg	Per Sample	50 - 70	60 - 80	80 - 100
67	Standard Calibration: XP10003S, Class: 2kg -10kg	Per Sample	120 - 160	100 - 210	200 - 260

JABATAN KEJURUTERAAN PROSES DAN MAKANAN (KPM)

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
1	Fast Protein Liquid Chromatography (FPLC)	Per Sample	220 - 290	290 - 380	360 - 470
2	Gas Phycnometer	Per Sample	40 - 50	50 - 70	60 - 80
3	Mocon Pac Check	Per Sample	10 - 15	15 - 20	20 - 25
4	Box Compression Tester	Per Sample	25 - 35	30 - 40	40 - 50
5	Automatic Envelop Density Analysis	Per Sample	25 - 35	30 - 40	40 - 50
6	Single Screw Extruder	Per Sample	320 - 415	425 - 555	530 - 690

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
7	Spinning Drop Surface Tension Meter	Per Sample	150 - 195	200 - 260	250 - 325
8	Oxygen Permeability Tester	Per Sample	120 - 155	160 - 210	200 - 260
9	Accelerated Solvent Extractor	Per Sample	90 - 115	120 - 155	150 - 195
10	Drop Tester	Per Sample	25 - 35	30 - 40	40 - 50
11	Malvern Particle Size Analyzer	Per Sample	60 - 80	80 - 100	100 - 130
12	Spray Drier	Per 2 hrs	120 - 155	160 - 210	200 - 260
13	Universal Instron Testing Machine (10 kN)	Per Sample	40 - 50	55 - 70	70 - 90
14	UV/Visible Spectrophotometer	Per Hour	12 - 16	15 - 20	20 - 26
15	Texture Analyzer	Per Sample	85 - 110	95 - 125	110 - 145
16	Rheometer	Per Sample	115 - 150	130 - 170	150 - 195
17	High Performance Liquid Chromatography (HPLC)	Fixed cost per day + 1st injection	90 - 105	100 - 120	115 - 135
		Subsequence injection	20 - 35	20 - 35	20 - 35
18	Thermo Mechanical Analyzer (TMA)	Per sampel	175 - 230	230 - 300	290 - 375
19	Thermo Gravimetric Analyzer (TGA)	Per Sample (for 2 hrs analysis)	180 - 230	240 - 310	300 - 390
20	Differential Scanning Calorimeter (DSC)	Per Sample	180 - 230	240 - 310	300 - 390
21	Moisture Analyzer	Per Sample	10 - 15	15 - 20	20 - 25
22	Gas Chromatography (FID)	Fixed cost per day + 1st injection	180 - 235	240 - 310	300 - 390
		Subsequence injection	15 - 30	15 - 30	15 - 30
23	Particle Size Analyzer (nano size)	Per Sample	120 - 155	150 - 195	200 - 260
24	Zeta Sizer	Per Sample	120 - 156	150 - 195	200 - 260
25	Freeze Dryer	Per Hour	27 - 35	29 - 37	32 - 42

Bil	Nama alat sewaan/Perkhidmatan/Ujian	Saiz ujian / saiz sampel / sewaan	Cadangan Kadar (RM)		
			Kategori A	Kategori B	Kategori C
26	Grinder	Per Hour	10 - 13	11 - 14	12 - 16
27	Proximate Analysis	Per Sample	220 - 286	242 - 315	266 - 346

Kategori A : Kakitangan Universiti, Pelajar, Persatuan UPM dan Anak Syarikat UPM

Kategori B : Kerajaan / Badan Berkanun / Agensi Kerajaan

Kategori C : Badan Perniagaan Kerajaan / Swasta / Persendirian / Koperasi / Orang Awam

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