UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER I
SESI 2012/2013

NAMA KURSUS	:	PENGURUSAN INDUSTRI
KOD KURSUS	:	BBT 4862
PROGRAM	:	SARJANA MUDA PENDIDIKAN TEKNIK & VOKASIONAL
TARIKH PEPERIKSAAN	:	DISEMBER 2012 / JANUARI 2013
JANGKA MASA	:	2 JAM 30 MINIT
ARAHAN	:	JAWAB SEMUA LIMA (5) SOALAN

KERTAS SOALAN INI MENGANDUNGI 14 MUKA SURAT

S1 (a) Nyatakan tiga (3) elemen asas dalam suatu sistem pembuatan industri dan terangkan secara ringkas elemen-elemen ini dalam konteks pembuatan automotif.

(6 markah)

(b) Jelaskan secara ringkas tiga (3) faktor tidak ketara yang mempengaruhi keputusan tapak.

(6 markah)

(c) Cap Sedap Sdn. Bhd. adalah syarikat yang menghasilkan minyak masak untuk eksport. Untuk pengembangan masa depan, syarikat ini mempunyai pilihan untuk alternatif tiga (3) tapak penghasilan, A, B dan C yang mempunyai struktur kos seperti di Jadual 1.

Jadual 1 : Struktur Kos Untuk Tiga Lokasi Alternatif

Tapak	Kos Tetap Setahun	Kos Berubah Setiap Tan
A	100,000	25
B	80,000	40
C	75,000	50

(i) Sekiranya Cap Sedap Sdn. Bhd. ingin menghasilkan 10,000 ton minyak masak tahun ini, tentukan tapak penghasilan yang paling sesuai.

(5 markah)

(ii) Sekiranya Cap Sedap Sdn. Bhd. ingin mempunyai keuntungan tahunan sebanyak RM40,000, hitungkan jumlah pengeluaran minyak masak setahun bagi setiap tapak sekiranya harga jualan ialah RM60 satu tan.

(3 markah)

S2 (a) Terangkan perbezaan di antara pembesaran kerja dan pengkayaan kerja dengan menggunakan satu contoh.

(3 markah)

(b) Berdasarkan satu kajian kerja yang teliti di perusahaan A100, hasil kajian bagi satu perkhidmatan penyediaan laporan telah dirumuskan di Jadual 2.

Jadual 2 : Analisis Kajian Kerja untuk Perkhidmatan Penyediaan Laporan

Elemen Kerja	Cerapan (Minit)					Peratus Prestasi
	1	2	3	4	5	
A	35	40	33	42	39	120%
B	12	10	36*	15	13	110%
C	3	3	5	5	4	90%
D	15	18	21	17	45*	85%

* Ralat Mesin

(i) Hitung masa biasa untuk setiap elemen kerja.

(4 markah)

(ii) Sekiranya kebenaran bagi jenis tugas ini ialah 15%, kira masa piawai.

(3 markah)

(iii) Tentukan bilangan cerapan yang diperlukan untuk 95% tahap keyakinan dan berada dalam ketepatan 5%. Anda perlu menghitung saiz sampel bagi setiap elemen kerja.

(10 markah)

S3 (a) Terangkan dua (2) faktor-faktor yang mempengaruhi peluang-peluang produk baru.

(2 markah)

(b) Huraikan dengan satu rajah empat (4) fasa untuk kitar hayat bagi satu produk.

(4 markah)

(c) Restoran Friday Mamak mempunyai beberapa susunatur dapur yang sedang dipertimbangkan untuk bahagian dapur. Strategi pemilihan adalah untuk menentukan susunatur dapur yang terbaik supaya chef-chef masak dapat menyiapkan makanan tepat pada masanya. Anda sebagai pengarah syarikat yang baru dilantik telah diarah untuk menilai kesemua susunatur dapur tersebut. Jarak di antara beberapa stesen-stesen kerja untuk dapur beserta susunaturnya telah diberikan dalam Rajah S3.

(i) Hitung jumlah jarak bagi setiap susunatur dapur.

(9 markah)

(ii) Di antara susunatur yang diberikan dalam Rajah S3, susunatur manakah yang paling sesuai? Nilai pilihan anda berdasarkan jumlah jarak yang paling minima.

(2 markah)

(iii) Disebabkan oleh pertukaran lokasi restoran dan kekangan fizikal, syarikat anda telah membuat keputusan bahawa susunatur ke-4 tidak lagi bersesuaian. Tambahan lagi, Jabatan Bomba telah mengeluarkan peraturan baru di mana bahagian penyimpanan tidak boleh bersebelahan dengan bahagian dapur/tempat masak. Berasaskan maklumat-maklumat baru ini, cadangkan susunatur dapur yang bersesuaian di antara pilihan-pilihan susunatur dapur yang sedia ada. Berikan sebab sokongan untuk pilihan baru anda.

(3 markah)

S4　(a)　Berikan dua (2) jenis inventori dengan penjelasan ringkas.

(2 markah)

(b)　Huraikan dua (2) jenis amalan penyelengaraan dengan penjelasan ringkas.

(2 markah)

(c)　Nyatakan elemen-elemen asas konsep 5S.

(5 markah)

(d)　Quik Office Sdn. Bhd., sebuah syarikat yang menawarkan perkhidmatan pencetakan dan laminat, menggunakan 816 unit toner pencetak setahun. Syarikat ini lazimnya membuat pesanan toner pencetak daripada pembekal A dengan kos pesanan RM12. Kos pemegangan ialah RM4 setiap toner setahun.

(i)　Dengan menggunakan model EOQ, hitung saiz pesanan optima.

(3 markah)

(ii)　Syarikat ini mengamalkan 240 hari bekerja setahun. Kira bilangan pesanan setiap tahun dan masa jangkaan di antara pesanan.

(3 markah)

(iii)　Syarikat ini telah menemui pembekal B, satu pembekal baru, yang menawarkan toner pencetak pada harga yang lebih kompetitif. Harga-harga pesanan berdasarkan kuantiti oleh pembekal A dan B telah dirumuskan seperti di dalam Jadual 3. Adalah diketahui bahawa pembekal B mempunyai kos pesanan RM14. Sekiranya permintaan untuk Quik Office Services Sdn. Bhd. ialah 1200 unit, pilih pembekal yang terbaik menerusi perbandingan jumlah kos.

Jadual 3 : Rumusan Harga Pesanan Berdasarkan Kuantiti

Units / Pesanan	Pembekal A	Pembekal B
1 hingga 49	RM 20	RM 19
50 hingga 79	RM 18	RM 17
80 hingga 99	RM 17	RM 16
Lebih 100	RM 15	RM 15

(5 markah)

S5 (a) Jelaskan dua (2) kepentingan perlaksanaan kualiti.

(4 markah)

(b) Proses bagi satu aktiviti pemasangan pesawat adalah seperti yang ditunjukkan di Jadual 4.

Jadual 4 : Aktiviti Proses bagi Pemasangan Pesawat

Aktiviti	Aktiviti Pendahuluan	Masa (hari)
A	-	5
B	A	2
C	A	4
D	B	5
E	B	5
F	C	5
G	E, F	2
H	D	3
I	G, H	5

(i) Lukiskan rajah rangkaian *activity-on-arrow (AOA)* yang sesuai.

(4 markah)

(ii) Berdasarkan jawapan anda di (i), tentukan laluan kritikal. Hitung jarak untuk laluan kritikal ini.

(4 markah)

(c) Sebuah syarikat pembuat alat permainan telah mengalami masalah kualiti di salah satu barisan pengeluarannya. Sebagai jurutera industri, anda telah ditugaskan untuk memeriksa masalah tersebut. Pada cubaan yang pertama, anda telah memungut 10 sampel yang mempunyai 15 produk setiap satu sampel dan bilangan kerosakan pada setiap sampel itu adalah seperti yang dipamerkan pada Jadual 5.

Jadual 5 : Bilangan Kerosakan Setiap Sampel Cerapan

Sampel	1	2	3	4	5	6	7	8	9	10
Bil. Kerosakan	3	1	0	0	0	2	0	3	1	0

(i) Bina satu carta-p dengan menggunakan 95.45% tahap keyakinan.

(5 markah)

(ii) Berdasarkan jawapan pemplotan data anda di (i), rumuskan cerapan-cerapan yang boleh anda perhatikan.

(3 markah)

S1 (a) State the three (3) basic elements of an industrial production system and explain briefly these elements in the context of an automobile manufacturing.

(6 marks)

(b) Describe briefly three (3) intangible factors that influences location decisions.

(6 marks)

(c) Cap Sedap Sdn. Bhd. is responsible in producing cooking oil for export. For future expansion, it has the alternative to choose from three (3) possible production sites, A, B and C that have the cost structure as shown in Table 1.

Table 1 : Cost Structure for Three Alternative Location

Site	Fixed Cost / Year	Variable Cost / Tonne
A	100,000	25
B	80,000	40
C	75,000	50

(i) If Cap Sedap Sdn. Bhd. wants to produce 10,000 tons of cooking oil this year, determine the most feasible production site.

(5 marks)

(ii) If Cap Sedap Sdn. Bhd. intents to have annual profits of RM40,000, calculate the production volume of cooking oil per year for each site if the selling price is RM60 per tonne.

(3 marks)

S2   (a)   Explain the difference(s) between job enlargement and job enrichment by using an example.

(3 marks)

(b)   Based on a careful work study in the A100 Enterprise, the results for a report preparation service have been summarized in Table 2.

Table 2 : Work Study Analysis for Report Preparation Service

Job Element	Observations (minutes)					Performance Rating
	1	2	3	4	5	
A	35	40	33	42	39	120%
B	12	10	36*	15	13	110%
C	3	3	5	5	4	90%
D	15	18	21	17	45*	85%

* Machine Error

(i)   Compute the normal time for each work element.

(4 marks)

(ii)   If the allowance for this type of work is 15%, calculate the standard time.

(3 marks)

(iii)   Determine the number of observations needed for a 95% confidence level within 5% accuracy. You may want to calculate the sample size for each job element.

(10 marks)

S3 (a) Explain two (2) factors that influences new product opportunities.

(2 marks)

(b) Describe with a diagram the four (4) phases of a product's lifecycle.

(4 marks)

(c) Friday Mamak Restaurant has a few kitchen layouts under consideration for its kitchen department. The strategy is to provide the best kitchen layout possible so that chefs can deliver their food on time. As the newly appointed director of the company, you have been asked to evaluate these kitchen layouts. Distances between different workstations of the kitchen and the kitchen layouts has been provided in Figure S3.

   (i) Calculate the total distance for each kitchen layout.

(9 marks)

   (ii) Among the layout given in Figure S3, which layout is the most feasible? Evaluate your choices based on the least/minimum total trip distance.

(2 marks)

   (iii) Due to restaurant location change and physical constraints, your company has decided that Kitchen Layout 4 is no longer a feasible choice. In addition, there is also a new rule by the fire department where the storage cannot be adjacent/beside the stove. Based on these new information, re-evaluate each kitchen layout choices and recommend a suitable kitchen layout. Give supporting reason for your new choice.

(3 marks)

S4 (a) Give two (2) types of inventories with brief explanations.

(2 marks)

(b) Describe two (2) types of maintenance practice with brief explanations.

(2 marks)

(c) State the basic elements of 5S concept.

(5 marks)

(d) Quik Office Services Sdn. Bhd., a company that offers document printing and laminating services, uses 816 units of printer toners annually. The company has been ordering toners from supplier A with the ordering cost of RM12. The holding cost is RM4 per toner per year.

(i) Using the EOQ model, calculate the optimal order size.

(3 marks)

(ii) The company has a 240 working days per year. Calculate the number of orders per year and the expected time between orders.

(3 marks)

(iii) The company had recently encountered that another supplier, supplier B, is offering toner supplies at a much competitive cost. The summary of order prices according to quantity supplied for supplier A and B is as shown in Table 3. It is given that supplier B has ordering cost of RM14. If the new demand for Quik Office Services Sdn. Bhd. is 1200 units, choose the best supplier through total cost comparison.

Table 3 : Summary of Order Prices According to Quantity

Units / Order	Supplier A	Supplier B
1 to 49	RM 20	RM 19
50 to 79	RM 18	RM 17
80 to 99	RM 17	RM 16
Over 100	RM 15	RM 15

(5 marks)

S5   (a)   Explain two (2) importance of quality implementation.

(4 marks)

(b)   The activity process for an aircraft assembly activities are described by Table 4.

Table 4 : Activity Process for an Aircraft Assembly

Activity	Immediate Predecessor(s)	Time (days)
A	-	5
B	A	2
C	A	4
D	B	5
E	B	5
F	C	5
G	E, F	2
H	D	3
I	G, H	5

(i)   Draw the appropriate activity-on-arrow (AOA) network diagram.

(4 marks)

(ii)   Based on your results in (i), determine the critical path. Calculate the length of the critical path.

(4 marks)

(c) A toy manufacturing company has been having quality problem in one of the product lines. As a industrial engineer, you have been asked to examine the facility. On the first occasion you have collect 10 samples of 15 products each and the number of defectives in each are shown below in Table 5.

Table 5 : Number of Defects per Samples of Observation

Sample	1	2	3	4	5	6	7	8	9	10
No. of Defects	3	1	0	0	0	2	0	3	1	0

(i) Construct a p-chart using a 95.45% confidence interval.

(5 marks)

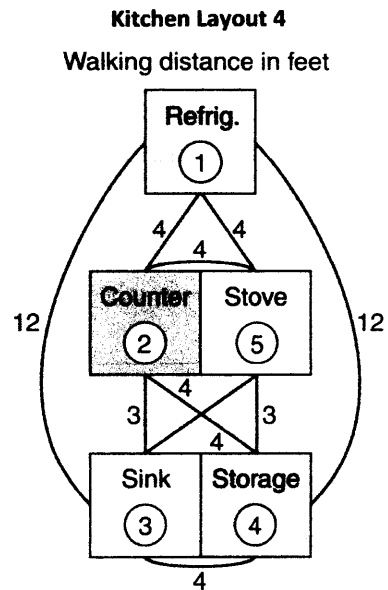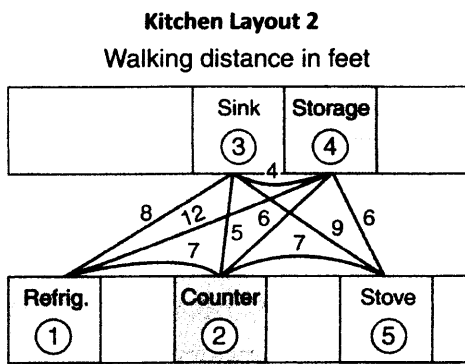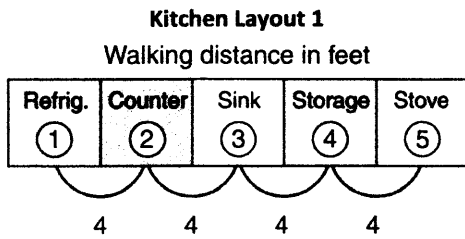(ii) Based on the plotted data points in (i), summarize the observations that you can make.
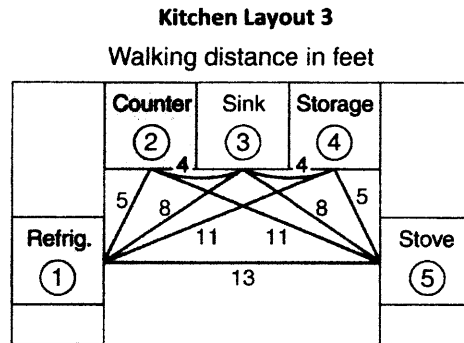
(3 marks)

PEPERIKSAAN AKHIR

SEMESTER / SESI   : SEMESTER II / 2012/2013   KURSUS : 4 BBV
NAMA SUBJEK   : PENGURUSAN INDUSTRI   KOD MATAPELAJARAN : BBT 4862

Number of trips between work centers:

From: \ To:	Refrigerator 1	Counter 2	Sink 3	Storage 4	Stove 5
Refrig. 1	0	8	13	0	10
Counter 2	5	0	3	3	8
Sink 3	3	12	0	4	0
Storage 4	3	0	0	0	5
Stove 5	0	8	4	10	0

Kitchen Layout 3

Walking distance in feet

Kitchen Layout 1

Walking distance in feet

Kitchen Layout 2

Walking distance in feet

Kitchen Layout 4

Walking distance in feet

RAJAH S3

14

FINAL EXAM

SEMESTER / SESSION : SEMESTER I / 2012/2013   COURSE : 4 BBV
SUBJECT NAME : INDUSTRIAL MANAGEMENT   SUBJECT CODE : BBT 4862

LIST OF FORMULA

Break-Even Analysis

Break-even Volume, $V_b = \dfrac{C_F}{P_s - C_v} = \dfrac{Fixed\ Cost}{Selling\ Cost/unit - Variable\ Cost/unit}$

Time Studies

Average observed time = (sum of times recorded) / number of observations

Normal time = (average observed time) x (performance rating factor)

Standard time = (total normal time) / (1 – allowance factor)

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}} = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n - 1}}$$

$$n = \left(\frac{zs}{h\bar{x}}\right)^2$$

n = Required sample size
z = number of standard deviations required for desired level of confidence (from table)
s = standard deviation of the initial sample
$\bar{x}$ = mean of sample size
h = accuracy level desired in percent of the job element, expressed as decimal (5% = .05)

$$n = \frac{z^2 p(1 - p)}{h^2}$$

n = Required sample size
z = number of standard deviations required for desired level of confidence (from table)
p = estimated value of sample proportion (of time worker is observed busy or idle)
h = acceptable error level, in percentage decimals (5% = .05)

Process Layout Analysis

$$minimize\ cost = \sum_{i=1}^{n}\sum_{j=1}^{n} X_{ij} C_{ij}$$

n = total number of work centers or depts

i, j = individual departments

X_{ij} = number of loads moved from dept. i to dept. j

C_{ij} = cost to move a load between dept. i and dept. j

FINAL EXAM

LIST OF FORMULA

Inventory Control

$$EOS = \sqrt{\frac{2DS}{H}}$$

Total Cost = Carrying costs + Ordering Costs + Puchase Costs

$$TC = \frac{QH}{2} + \frac{DS}{Q} + PD$$

D = Demand, S = Ordering Cost, H = Holding Cost, Q = units per order

Statistical Process Control: Mean Chart

Upper Control Limit (UCL) = $\bar{x} + z\sigma_{\bar{x}}$

Lower Control Limit (LCL) = $\bar{x} - z\sigma_{\bar{x}}$

$\bar{x}$ = mean of the sample means or a target value set for the process

z = number of normal standard deviations (2 for 95.45%, 3 for 99.73%)

$\sigma_{\bar{x}}$ = standard deviation of the sample means = $\frac{\sigma}{\sqrt{n}}$

σ = population (process) standard deviation

n = sample size

Statistical Process Control: p- Chart

$$\sigma_{\hat{p}} = \sqrt{\frac{\bar{p}(1 - \bar{p})}{n}}$$

$$UCL_p = \bar{p} + z\sigma_{\hat{p}}$$

$$LCL_p - \bar{p} - z\sigma_{\hat{p}}$$

$\bar{p}$ = mean fraction defective in sample

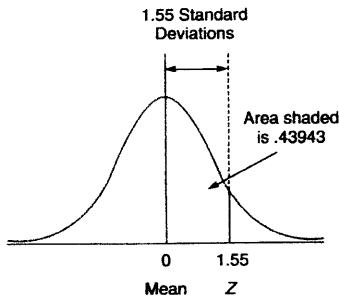z = number of standard deviations (2 for 95.45%, 3 for 99.73%)

$\sigma_{\hat{p}}$ = standard deviation of the sampling distribution

FINAL EXAM

SEMESTER / SESSION   : SEMESTER I / 2012/2013   COURSE   :   4 BBV
SUBJECT NAME   : INDUSTRIAL MANAGEMENT   SUBJECT CODE : BBT 4862

NORMAL DISTRIBUTION TABLE

1.55 Standard
Deviations

Area shaded
is .43943

0   1.55
Mean   Z

As an alternative to Table I.1, the numbers in Table I.2 represent the proportion of the total area away from the mean, μ, to one side. For example, the area between the mean and a point that is 1.55 standard deviations to its right is .43943.

TABLE I.2

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.00000	.00399	.00798	.01197	.01595	.01994	.02392	.02790	.03188	.03586
0.1	.03983	.04380	.04776	.05172	.05567	.05962	.06356	.06749	.07142	.07535
0.2	.07926	.08317	.08706	.09095	.09483	.09871	.10257	.10642	.11026	.11409
0.3	.11791	.12172	.12552	.12930	.13307	.13683	.14058	.14431	.14803	.15173
0.4	.15542	.15910	.16276	.16640	.17003	.17364	.17724	.18082	.18439	.18793
0.5	.19146	.19497	.19847	.20194	.20540	.20884	.21226	.21566	.21904	.22240
0.6	.22575	.22907	.23237	.23565	.23891	.24215	.24537	.24857	.25175	.25490
0.7	.25804	.26115	.26424	.26730	.27035	.27337	.27637	.27935	.28230	.28524
0.8	.28814	.29103	.29389	.29673	.29955	.30234	.30511	.30785	.31057	.31327
0.9	.31594	.31859	.32121	.32381	.32639	.32894	.33147	.33398	.33646	.33891
1.0	.34134	.34375	.34614	.34850	.35083	.35314	.35543	.35769	.35993	.36214
1.1	.36433	.36650	.36864	.37076	.37286	.37493	.37698	.37900	.38100	.38298
1.2	.38493	.38686	.38877	.39065	.39251	.39435	.39617	.39796	.39973	.40147
1.3	.40320	.40490	.40658	.40824	.40988	.41149	.41309	.41466	.41621	.41174
1.4	.41924	.42073	.42220	.42364	.42507	.42647	.42786	.42922	.43056	.43189
1.5	.43319	.43448	.43574	.43699	.43822	.43943	.44062	.44179	.44295	.44408
1.6	.44520	.44630	.44738	.44845	.44950	.45053	.45154	.45254	.45352	.45449
1.7	.45543	.45637	.45728	.45818	.45907	.45994	.46080	.46164	.46246	.46327
1.8	.46407	.46485	.46562	.46638	.46712	.46784	.46856	.46926	.46995	.47062
1.9	.47128	.47193	.47257	.47320	.47381	.47441	.47500	.47558	.47615	.47670
2.0	.47725	.47778	.47831	.47882	.47932	.47982	.48030	.48077	.48124	.48169
2.1	.48214	.48257	.48300	.48341	.48382	.48422	.48461	.48500	.48537	.48574
2.2	.48610	.48645	.48679	.48713	.48745	.48778	.48809	.48840	.48870	.48899
2.3	.48928	.48956	.48983	.49010	.49036	.49061	.49086	.49111	.49134	.49158
2.4	.49180	.49202	.49224	.49245	.49266	.49286	.49305	.49324	.49343	.49361
2.5	.49379	.49396	.49413	.49430	.49446	.49461	.49477	.49492	.49506	.49520
2.6	.49534	.49547	.49560	.49573	.49585	.49598	.49609	.49621	.49632	.49643
2.7	.49653	.49664	.49674	.49683	.49693	.49702	.49711	.49720	.49728	.49736
2.8	.49744	.49752	.49760	.49767	.49774	.49781	.49788	.49795	.49801	.49807
2.9	.49813	.49819	.49825	.49831	.49836	.49841	.49846	.49851	.49856	.49861
3.0	.49865	.49869	.49874	.49878	.49882	.49886	.49889	.49893	.49897	.49900
3.1	.49903	.49906	.49910	.49913	.49916	.49918	.49921	.49924	.49926	.49929