UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Pertama
Sidang Akademik 2006/2007

Oktober/November 2006

EPM 441E/4 - Pengurusan Pengeluaran

Masa : 3 jam

ARAHAN KEPADA CALON :

Sila pastikan bahawa kertas soalan ini mengandungi **SEMBILAN** (9) mukasurat dan **TUJUH** (7) soalan yang bercetak serta **SATU** (1) helaian lampiran sebelum anda memulakan peperiksaan.

Sila jawab **LIMA** (5) soalan sahaja.

Pelajar dibenarkan menjawab **soalan No. 5 – No. 7** dalam **Bahasa Inggeris** ATAU **Bahasa Malaysia** ATAU kombinasi kedua-duanya. **Soalan No. 1 - No. 4** perlu dijawab dalam **Bahasa Inggeris.**

Lampiran :

1. Appendix 1: Normal Distribution [1 mukasurat]

Setiap soalan mestilah dimulakan pada mukasurat yang baru.

S1. (a) **Huraikan LIMA (5) kriteria utama dan EMPAT (4) aktiviti sokongan yang berkaitan dengan rangkaian nilai.**

Describe the FIVE (5) primary and FOUR (4) support activities related with value chain.

(30 markah)

(b) **Berikan maksud pengurusan operasi. Huraikan TIGA (3) bidang keputusan pengurusan yang utama yang berkaitan dengan pengurusan operasi.**

Define operations management. Describe THREE (3) major management decision area related with operations management.

(50 markah)

(c) **Sekumpulan pekerja membuat 400 unit produk, di mana kos piawai ialah RM10 seunit. Jabatan perakaunan melaporkan bahawa kos sebenar kerja ini ialah RM400 bagi kos pekerja, RM1,000 bagi kos bahan dan RM300 bagi kos overhed. Cari produktiviti bagi proses ini.**

A team of workers make 400 units of a product, which is valued by its standard costs of RM10 each. The accounting department reports that for this job the actual costs are RM400 for labour, RM1,000 for materials and RM300 for overhead. Find the productivity for this process.

(20 markah)

S2. (a) (i) **Nyatakan dan huraikan jenis-jenis inventori.**

State and describe different types of inventory.

(ii) **Bincangkan keperluan menjaga inventori.**

Discuss the necessity of maintaining inventory.

(30 markah)

(b) **Sebuah syarikat mengambil kira penggunaan analisis ABC untuk fokus kepada item yang paling kritikal dalam inventori mereka. Bagi LAPAN (8) sampel item yang dipilih secara rawak, Jadual S2(b) berikut menunjukkan nilai unit dan permintaan tahunan bagi setiap item. Kategorikan item-item ini sebagai kelas A, B dan C. Tunjukkan juga keputusan dalam bentuk graf.**

A company is considering the use of ABC analysis to focus on the most critical items in its inventory. For a random sample of EIGHT (8) item, the following Table Q2(b) givens item unit value and annual demand. Categorize these items as A, B, and C classes. Show also the result by graphical presentation.

Jadual S2(b)
Table Q2(b)

Kod Item *Item Code*	**Nilai Unit** *Unit Value* **(RM)**	**Permintaan (Unit)** *Demand (Units)*
A104	40.25	80
D205	80.75	120
X104	10.00	150
U 404	40.50	150
L205	60.70	50
S104	80.20	20
X205	80.15	20
L104	20.05	100

(35 markah)

(c) Cari kuantiti pesanan yang ekonomik, titik pesanan semula dan jumlah kos tahunan dengan merujuk maklumat berikut.

Permintaan tahunan (D) = 1000 unit
Purata permintaan harian $(\overline{d})$= 100/365
Kos pesanan (s) = RM5 setiap pesanan
Kos penahan (H) = RM1.25 seunit setiap tahun
Masa mendulu (L) = 5 hari
Kos seunit (c) = RM12.50

Find the economic order quantity re-order point and total annual cost, given the following information.

Annual demand (D) = 1000 units
Average daily demand $(\overline{d})$= 100/365
Ordering cost (s) = RM5 per order
Holding cost (H) = RM1.25 per unit per year
Lead-time (L) = 5 days
Cost per unit (c) = RM12.50

(35 markah)

S3. (a) **Pekerja-pekerja Syarikat Telekomunikasi Malaysia bertanggungjawab memasang kabel telefon dan melaksanakan pelbagai kerja-kerja pembinaan. Syarikat ini terkenal dengan memberikan perkhidmatan yang baik dan berusaha menyiapkan semua pesanan perkhidmatan dalam jangka masa perancangan yang telah ditetapkan.**

Setiap pekerja diletakkan dalam 600 jam bagi masa kebiasaan setiap jangka masa perancangan dan boleh bekerja lebih masa sehingga 100 jam. Jabatan operasi telah menganggarkan keperluan tenaga kerja untuk perkhidmatan tertentu pada 4 tempoh jangka masa perancangan seperti jadual berikut.

Jangkamasa Perancangan *Planning Period*	**1**	**2**	**3**	**4**
Permintaan (Jam) *Demand (hours)*	**21,000**	**18,000**	**30,000**	**12,000**

Maklumat berikut juga diberikan:

Gaji bagi masa biasa = RM6000
(seorang pekerja bagi tempoh 4 bulan)

Tenaga kerja permulaan = 40
Masa kebiasaan mengikut jam bagi setiap pekerja = 600
Kerja lebih masa maksima bagi setiap pekerja = 100
Kadar kerja lebih masa (RM/jam) = RM15
Kos pengambilan seorang pekerja = RM8000
Kos pemberhentian seorang pekerja = RM2000

Binakan plan tenaga kerja yang diperlukan dengan menggunakan kaedah lebihan masa dan di bawah masa. Maksimakan penggunaan lebihan masa semasa masa puncak supaya dapat meminimakan tenaga kerja dan jumlah bawah masa.

The employees of Telekom Malaysia are responsible to fix the telephone cable and perform other construction works. The company is known for excellent service and make effort to complete all service within the stipulated planned time period.

Each worker puts in 600 hours of regular time per planning period and can work as much as an additional 100 hours of overtime. The operation department has estimated the following work force requirement for such services over the next four planning periods:

Following information are also provided:

Regular time wages = RM6000
(per worker per quarter)

Starting workforce = 40
Regular time hrs per worker = 600
Max overtime hrs per worker = 100
Overtime rate (RM/hour) = RM15
Cost to hire one worker = RM8000

Cost to lay off one worker = RM2000

Develop a level workforce plan that uses only the overtime and under time alternatives. Maximize the use of overtime during the peak period so as to minimize the workforce level and amount of under time.

(60 markah)

(b) Huraikan TIGA (3) peraturan mensaiz lot dan bandingkan kecekapannya dari segi pengurangan inventori/kos inventori.

Describe the THREE (3) lot sizing rules and compare their effectiveness in view of reducing inventory/inventory costs.

(40 markah)

S4. (a) Huraikan perancangan agregat dengan pendekatan spreadsheet dan juga strategi aras dengan lebihan masa dan bawah masa.

Describe the aggregate planning with spreadsheet approach and also level strategy with overtime and under time.

(40 markah)

(b) Rekod inventori separa siap bagi subpemasangan *"tabletop"* ditunjukkan seperti jadual di bawah yang menunjukkan keperluan kasar, jadual penerimaan, masa mendulu, dan inventori dalam simpanan semasa.

Jadual S4(b)
Table Q4(b)

Masa Mendulu = 2 minggu
Lead Time = 2 week

	Minggu/*Week*									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Keperluan kasar *Gross requirement*	**90**		**85**		**80**		**45**	**90**		
Jadual penerimaan *Scheduled receipts*	**110**									
Inventori dalam tangan yang dikeluarkan *Projected on hand inventory*										
Perancangan penerimaan *Planned receipts*										
Perancangan melepaskan pesanan *Planned order releases*										

i) Lengkapkan tiga baris terakhir bagi rekod Kuantiti Pesanan Tetap (FOQ) bagi 110 unit.

ii) Lengkapkan tiga baris terakhir bagi rekod di atas dengan menggunakan peraturan saiz-lot L4L.

iii) Lengkapkan tiga baris terakhir bagi rekod di atas dengan menggunakan Kuantiti Pesanan Berkala (POQ), dengan p = 2.

The partially completed inventory record for the tabletop subassembly is shown Table Q4(b), which shows gross requirements, scheduled receipts, lead time, and current on-hand inventory.

i) Complete the last three rows of the record for a Fixed Order Quantity (FOQ) of 110 units.
ii) Complete the last three rows of the record by using the L4L lot-Sizing rule.
iii) Complete the last three rows of the record by using the Perodic Order Quantity (POQ), with p = 2.

(60 markah)

5. (a) **Nyatakan TIGA (3) strategi saingan selain berdasarkan kos. Terangkan secara ringkas strategi berdasarkan kos dari perspektif kaedah bagi mencapai kebolehsaingan.**

State THREE (3) competition strategies other than cost-based. Explain briefly cost-based strategy in terms of its methodology to achieve competitiveness.

(35 markah)

(b) **Terangkan secara ringkas TIGA (3) kriteria yang mengaitkan strategi kebolehsaingan dalam pemilihan teknologi proses pembuatan.**

Explain briefly THREE (3) criteria linking the competitive strategy in the selection of manufacturing process technology.

(35 markah)

(c) **Jualan PROTON Gen2 telah meningkat di sebuah syarikat pengedar seperti di jadual S5(c) di bawah. Pada tahun 2000, pengurus jualannya telah meramalkan jualan sebanyak 410 untuk tahun 2001:**

i) Guna $\alpha = 0.30$, bagi kiraan ramalan bagi tahun 2002 hinnga 2006
ii) Kira purata peratusan silap absolute
iii) Guna kaedah regresi linear bagi ramalan tahun 2007

Sales of PROTON Gen2 had grown steadily at an auto dealer as in table Q5(c) below. In year 200, the sales manager had predicted sales of 410 for 2001:

i) Using $\alpha = 0.30$, Calculate the forecast for 2002 to 2006.
ii) Calculate the mean absolute percent error (MAPE)
iii) Use linear regression to predict for year 2007

TAHUN *YEAR*	**Jualan Sebenar** *Actual Sales*	**Ramalan** *Forecast*
2001	450	410
2002	495	
2003	518	
2004	563	
2005	584	
2006		

Jadual S5(c)
Table Q5(c)

(30 markah)

S6. (a) **Perancangan proses ada lima (5) langkah. Beli atau buat merupakan keputusan pertama. Senaraikan EMPAT (4) langkah langkah lain. Terangkan secara ringkas kriteria-kriteria dalam keputusan buat atau beli.**

Process planning involves five (5) steps. Make or buy decision is the first step. List the other FOUR (4) steps. List and explain briefly criteria in the make or buy decision.

(30 markah)

(b) **Secara ringkas, terangkan berkenaan perancangan kapasiti bagi proses dan berikan DUA (2) akibat jika**

i) **kapasiti melampaui pemintaan**
ii) **permintaan melampaui kapasiti**

Explain briefly capacity planning for processes and give TWO (2) consequences each if

i) capacity exceeds demand excessively
ii) demand exceeds capacity excessively

(30 markah)

(c) **Uniplastik Sdn. Bhd. bercadang melabur untuk sebuah kilang baru. Mereka perlu membuat keputusan untuk kapasiti kilang tersebut. Jadual S6(c) dibawah mempamerkan keadaan alternatif antara pemintaan mendatang dan saiz kilang. Jika dalam keadaan dimana maklumat tidak lengkap, kira saiz kilang untuk**

i) **Keadaan MAXIMIN**
ii) **Keadaan Kesalan Minimum**
iii) **Kajian pemasaran menyatakan kebarangkalian(kecil) = 0.4. kebarangkalian (sedang) = 0.5, dan kebarangkalian (besar) = 0.6, Kira saiz kilang yang terbaik**

Uniplastic Sdn Bhd decided to invest in a new manufacturing plant. They have to decide the capacity of the plant. Table Q6(c) below indicate the conditions of the alternatives between future demand and plant size. In the condition where the information is NOT perfect, calculate the best plant size for:

i) MAXIMIN condition
ii) Minimum Regret condition
iii) Market survey shows that Probability (small) is 0.4, Probability (medium) is 0.5 and the Probability (large) is 0.6. Find the best decision for the plan size.

PERMINTAAN MENDATANG
Future Demand

Saiz kilang *Plant size*	**RENDAH** *Low demand*	**SEDANG** *Medium*	**TINGGI** *High*
KECIL *(Small)*	200	250	270
SEDANG *(Medium)*	180	280	400
BESAR *(Large)*	160	400	800

Jadual S6(c)
Table Q6(c)

(40 markah)

S7. (a) Teknologi rekabentuk dan pemprosesan produk mampu mempercepatkan pengenalan produk ke pasaran.

i) Bagaimana CAD CAM membantu keadaan tersebut
ii) Bagaiamana rekabentuk modular membantu keadaan tersebut.

Technology in product design and process can speed up product introduction to the market.

i) How does CAD-CAM help to achieve that situation?
ii) How does modular design help to achieve that situation?

(25 markah)

(b) Lakarkan matriks produk proses. Natakan SATU hubungkait antara matriks tersebut dengan keputusan jenis susunatur. Kaitkan jenis susunatur terhadap matriks yang anda telah lakar.

Sketch the product-process matrix. State ONE (1) relationship between that matrix and the decisions for layout type? Link the suitable layout type toward the matrix that you had sketched.

(30 markah)

(c) Syarikat anda mengeluarkan mesin pemotong rumput dan data barisan pemasangan di pamerkan di Jadual S7(c). Kadar keluaran di ingini adalah 192 unit dalam masa syif lapan jam

i) Lakarkan rajah urutan (precedence)
ii) Kira masa kitar yang di ingini
iii) Kira jumlah minimum secara teori bagi stesenkerja .
iv) Kira masa lewa
v) Kira keberkesanan barisan
vi) Kira peratusan lewat yang berimbang

Your company manufactures lawn movers and its assembly line data is shown in Table Q7(c). The desired output rate is 192 units in an eight hour shift

i) Draw a precedence diagram for this assembly line.
ii) Calculate the desired cycle time
iii) Calculate theoretical minimum number of workstation
iv) Calculate the idle time
v) Calculate the efficiency of line
vi) Calculate balance delay percentage

Jadual S7(c)
Table Q7(c)

Elemen Kerja *Work element*	**Masa memproses (saat)** *Process time (seconds)*	**Elemen kerja sebelumnya yang terdekat** *Work element Immediate predecessor (s)*
A	40	none
B	80	A
C	30	D,E,F
D	25	B
E	20	B
F	15	B
G	120	A
H	145	G
1	130	H
J	115	C,I
Total	720	

(45 markah)

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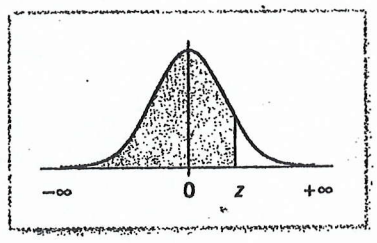
LAMPIRAN 1
APPENDIX 1

APPENDIX 1:
Normal Distribution



	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998