UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Sekolah Pendidikan Profesional dan Pendidikan Berterusan (UTMSPACE)

FINAL EXAMINATION / *PEPERIKSAAN AKHIR*
SEMESTER 1 – SESSION 2016 / 2017
PROGRAM KERJASAMA

COURSE CODE *KOD KURSUS*	:	DSM 0023 / DDSM 0023
COURSE NAME *NAMA KURSUS*	:	FURTHER MATHEMATICS / *MATEMATIK LANJUTAN*
YEAR / PROGRAMME *TAHUN / PROGRAM*	:	ENRICHMENT / *PENGUKUHAN*
DURATION *TEMPOH*	:	3 HOURS / *3 JAM*
DATE *TARIKH*	:	OCTOBER 2016

INSTRUCTION/*ARAHAN* :

1. Answer ALL **SIX (6)** questions .
   *Jawab SEMUA ENAM **(6)** soalan .*

2. Candidates are required to follow all instructions given out by the examination invigilators.
   Calon dikehendaki mematuhi semua arahan daripada penyelia peperiksaan.

3. A list of formula is given on the last page.
   Satu senarai formula di berikan pada mukasurat terakhir.

(You are required to write your name and your lecturer's name on your answer script)
(Pelajar dikehendaki tuliskan nama dan nama pensyarah pada skrip jawapan)

NAME / *NAMA*	:	.....
I.C NO. / *NO. K/PENGENALAN*	:	.....
YEAR / COURSE *TAHUN / KURSUS*	:	.....
COLLEGE NAME ***NAMA KOLEJ***	:	.....
LECTURER'S NAME *NAMA PENSYARAH*	:	.....

This examination paper consists of ...7... pages including the cover
Kertas soalan ini mengandungi .....7..... muka surat termasuk kulit hadapan

1. (a) **Simplify the following expression:**
Permudahkan ungkapan berikut:

(i) $\dfrac{16u^2v^3}{2u^3v}$

(ii) $(x-2)^2 + x(x+4)$

(b) **If** $f(x) = x^2$ **and** $g(x) = \sqrt{2x+1}$, **find the values of the following:**

Jika $f(x) = x^2$ *dan* $g(x) = \sqrt{2x+1}$, *dapatkan nilai bagi yang berikut :*

(i) $f(-3) + g(4)$ (ii) $\dfrac{f(5)}{g(12)}$

(c) **Express** T **in terms of** u, v **and** t^2.
Ungkapkan T *dalam sebutan* u, v *dan* t^2.

$$8vT = 3t^2 - Tv$$

(15 M)

2. (a) **Find the value of** m **if** $P(x) = 2x^3 + 6x^2 + mx - 1$ **is divisible by** $(x+2)$.
Dapatkan nilai m jika $P(x) = 2x^3 + 6x^2 + mx - 1$ *boleh dibahagi dengan* $(x+2)$.

(b) **Find the value of** n **if** $Q(x) = x^5 + nx^2 + 2x - 1$ **has remainder** $2x+1$ **when divided by** $(x-1)$.
Dapatkan nilai m jika $Q(x) = x^5 + nx^2 + 2x - 1$ *mempunyai baki* $2x+1$ *apabila dibahagi dengan* $(x-1)$.

(c) **What are the values of** p **and** q **if** $H(x) = x^3 + px^2 + 2x + q$ **is divisible by** $(x+2)$ **and leaves a remainder of** -4 **when divided by** $(x-3)$.
Apakah nilai – nilai bagi p dan q jika $H(x) = x^3 + px^2 + 2x + q$ *boleh dibahagi dengan* $(x+2)$ *dan meninggalkan baki* -4 *apabila dibahagi dengan* $(x-3)$.

(15 M)

3. (a) **Solve the following inequalities.**

Selesaikan ketaksamaan berikut.

(i) $\frac{x-4}{5} < \frac{2x+3}{3}$

(ii) $6x - 3 \geq 21 - 2x$

(iii) $x^2 + 3x \geq 5 - x$

(b) **A box contains 12 beads: 7 are green, 3 are orange and 2 are black. Calculate the probability that when one bead is selected at random, it will be**

(a) orange (b) not green (c) either green or black

Sebuah kotak mengandungi 12 biji manik: 7 hijau, 3 oren dan 2 hitam. Dapatkan kebarangkalian apabila sebiji manik diambil secara rawak, ia adalah

(a) oren (b) bukan hijau (c) samada hijau atau hitam

(15 M)

4. (a) **Given the Arithmetic series**

Diberi siri Aritmetik $4 + 10 + 16 + 22 + \cdots + 334$

(i) **State the values of the first term and the common difference.**

Nyatakan nilai-nilai bagi sebutan pertama dan beza sepunya.

(ii) **Find the number of terms in the series.**

Dapatkan bilangan sebutan siri ini.

(iii) **Find the sum of the all the terms of the series.**

Dapatkan hasil tambah semua sebutan siri ini.

(b) **The third term of a geometric series is 32 and the sixth term is 4. Find:**

Sebutan ketiga suatu janjang geometri ialah 32 dan sebutan keenam ialah 4. Dapatkan:

(i) **the first term and the common ratio**

sebutan pertama dan beza sepunya

5. **The table below shows the age of 100 employees in SP Company.**
Jadual di bawah menunjukkan umur 100 pekerja dari Syarikat SP.

Age *Umur*	**Midpoint** *Titik tengah* x	**Frequency** *frekuensi* f	fx	fx^2
21 – 25		10		
26 – 30		35		
31 – 35		16		
36–40		14		
41 – 45		13		
46 – 50		10		
51 – 55		3		

Table 1 / *Jadual 1*

(a) **Copy the table and fill in the columns as required .**
Salin jadual dan penuhkan ruangan seperti dikehendaki.

(b) **Find the mean and standard deviation of the data set.**
Dapatkan min dan sisihan piawai bagi taburan tersebut.

(c) **Find the median and mode of the data set.**
Dapatkan median dan mod bagi taburan tersebut.

(20 M)

6. (a) **Given** $y = 5x^4 - 4x^3 + kx$, **find the value of** k **given** $\frac{dy}{dx} = 6$ **when** $x = 1$.

Diberi $y = 5x^4 - 4x^3 + kx$, *dapatkan nilai* k *jika* $\frac{dy}{dx} = 6$ *apabila* $x = 1$.

(b) **Find** $\frac{dy}{dx}$:

Dapatkan $\frac{dy}{dx}$:

(i) $y = (3x^2 + 1)(x^5 - 4x + 2)$

(ii) $y = \frac{5x+1}{2x^2}$

(c) **Evaluate:**

Nilaikan:

(i) $\int x\left(4x^2 + \sqrt{x}\right) dx.$

(ii) $\int_0^1 (x^2 - 2x + 3\ )dx$

(20 M)

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

FORMULAE

1. $S_n = \frac{n}{2}(2a + (n-1)d)$

2. $T_n = a + (n-1)d$

3. $S_n = \frac{a(1-r^n)}{1-r} = \frac{a(r^n-1)}{r-1}, r \neq 1$

4. $T_n = ar^{n-1}$

5. Mean $= \bar{x} = \frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$

6. Median $= L + \left(\frac{\frac{1}{2}N - F}{f_m}\right)C$

7. Mode $= L + \left(\frac{\lambda_1}{\lambda_1 + \lambda_2}\right) \times C$

8. Variance, $s^2 = \frac{\sum fx^2}{N} - \left(\frac{\sum fx}{N}\right)^2$

9. $\frac{d}{dx}(u^n) = nu^{n-1}\left(\frac{du}{dx}\right)$

10. $\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$

11. $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$

12. $\int x^n dx = \frac{1}{(n+1)}x^{n+1} + c \; ; \quad n \neq -1$

13. $\int (ax+b)^n dx = \frac{1}{a(n+1)}(ax+b)^{n+1} + c \; ; \quad n \neq -1$