UTM UNIVERSITI TEKNOLOGI MALAYSIA | Sekolah Pendidikan Profesional dan Pendidikan Berterusan (SPACE)

FINAL EXAMINATION / *PEPERIKSAAN AKHIR*
SEMESTER II – SESSION 2020 / 2021
PROGRAM KERJASAMA

COURSE CODE *KOD KURSUS*	:	DDSM 0013
COURSE NAME *NAMA KURSUS*	:	BASIC MATHEMATICS *MATEMATIK ASAS*
YEAR / PROGRAMME *TAHUN / PROGRAM*	:	ENRICHMENT / *PENGUKUHAN*
DURATION *TEMPOH*	:	3 HOURS *3 JAM*
DATE *TARIKH*	:	APRIL/MAY 2021 *APRIL/MEI 2021*

INSTRUCTION / *ARAHAN:*

1. Answer **ALL** (7) questions questions and write your answers on the answer sheet.
   *Jawab **SEMUA** (7) soalan dan tulis jawapan anda pada kertas jawapan.*

2. A list of formula is given at the end of the question paper for reference.
   Senarai rumus di sediakan di bahagian akhir kertas soalan sebagai rujukan.

1. Write your name, matric no., identity card no., course code, course name, section no. and lecturer's name on the first page (in the upper left corner) and every page thereafter on the answer sheet.
   Tulis nama anda, no. matrik, no. kad pengenalan, kod kursus, nama kursus, no. seksyen dan nama pensyarah pada muka surat pertama(penjuru kiri atas)kertas jawapan dan pada setiap muka surat jawapan.

2. Each answer sheet must have a page number written at the bottom right corner.
   Setiap helai kertas jawapan mesti ditulis nombor muka surat pada bahagian bawah penjuru kanan.

3. Answers should be handwritten, neat and clear.
   Jawapan hendaklah ditulis tangan, kemas dan jelas menggunakan huruf cerai.

WARNING / *AMARAN*

Students caught copying / cheating during the examination will be liable for disciplinary actions and the faculty may recommend the student to be expelled from sitting for exam.
Pelajar yang ditangkap meniru / menipu semasa peperiksaan akan dikenakan tindakan disiplin dan pihak fakulti boleh mengesyorkan pelajar diusir dari menduduki peperiksaan.

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

ONLINE EXAMINATION RULES AND REGULATIONS
PERATURAN PEPERIKSAAN SECARA DALAM TALIAN

1. Student must carefully listen and follow instructions provided by invigilator.
   Pelajar mesti mendengar dan mengikuti arahan yang diberikan oleh pengawas peperiksaan dengan teliti.

2. Student is allowed to start examination only after confirmation of invigilator if all needed conditions are implemented.
   Pelajar dibenarkan memulakan peperiksaan hanya setelah pengesahan pengawas peperiksaan sekiranya semua syarat yang diperlukan telah dilaksanakan.

3. During all examination session student has to ensure, that he is alone in the room.
   Semasa semua sesi peperiksaan pelajar harus memastikan bahawa dia bersendirian di dalam bilik.

4. During all examination session student is not allowed to use any other devices, applications except other sites permitted by course lecturer.
   Sepanjang sesi peperiksaan pelajar tidak dibenarkan menggunakan peranti dan aplikasi lain kecuali yang dibenarkan oleh pensyarah kursus.

5. After completing the exam student must inform invigilator via the set communication platform (eg. WhatsApp etc.) about completion of exam and after invigilator's confirmation leave examination session.
   Selepas peperiksaan selesai, pelajar mesti memaklumkan kepada pengawas peperiksaan melalui platform komunikasi yang ditetapkan (contoh: Whatsapp dan lain-lain) mengenai peperiksaan yang telah selesai dan meninggalkan sesi peperiksaan selepas mendapat pengesahan daripada pengawas peperiksaan.

6. Any technical issues in submitting answers online have to be informed to respective lecturer within the given 30 minutes. Request for re-examination or appeal will not be entertain if complains are not made by students to their lecturers within the given 30 minutes.
   Sebarang masalah teknikal dalam menghantar jawapan secara dalam talian perlu dimaklumkan kepada pensyarah masing-masing dalam masa 30 minit yang diberikan. Permintaan untuk pemeriksaan semula atau rayuan tidak akan dilayan sekiranya aduan tidak dibuat oleh pelajar kepada pensyarah mereka dalam masa 30 minit yang diberikan.

7. During online examination, the integrity and honesty of the student is also tested. At any circumstances student is not allowed to cheat during examination session. If any kind of cheating behaviour is observed, UTM have a right to follow related terms and provisions stated in the respective Academic Regulations and apply needed measures.
   Semasa peperiksaan dalam talian, integriti dan kejujuran pelajar juga diuji. Walau apa pun keadaan pelajar tidak dibenarkan menipu semasa sesi peperiksaan. Sekiranya terdapat sebarang salah laku, UTM berhak untuk mengikuti terma yang dinyatakan dalam Peraturan Akademik.

Excerpts from online final exam guidelines
Petikan daripada panduan peperiksaan akhir dalam talian Universiti Teknologi Malaysia

1. (a) Evaluate and round off the answer to three significant figures.

Nilaikan ungkapan dan bundarkan jawapan kepada tiga angka bererti.

$$\frac{48881 \times 66.888}{20 \times 10^3}$$

(2M)

(b) Convert the following numbers to base 10.

Tukarkan nombor – nombor berikut kepada asas 10.

(i) 10111_2 **(ii)** 6677_8

(4M)

(c) Convert $3A8_{16}$ to base 8.

Tukarkan $3A8_{16}$ kepada asas 8. **(2M)**

(d) Evaluate

Nilaikan

$$11101_2 + 1001_2$$

(2M)

2. (a) Simplify the following expressions using the rule of indices.

Permudahkan ungkapan berikut menggunakan hukum indeks.

(i) $\frac{512^{(1/3)}216^{(1/3)}}{64^{(1/3)}}$ **(ii)** $(5a^3b^8c^6)(6a^7b^{\frac{1}{2}})$

(4M)

(b) Simplify the following using the law of logarithm.

Permudahkan yang berikut menggunakan hukum logaritma.

(i) $4log_7 2 + 2log_7 8 - log_7 8$

(ii) $log_6(46656)$

(4M)

(c) Find the value of *x* in the following equation:

Dapatkan nilai x dalam persamaan berikut:

$$216^{2x} = 6^{2x+1}$$

(2M)

3. (a) Given two points $A(5, -8)$ and $B(4, 6)$, find

Diberi dua titik $A(5, -8)$ dan $B(4, 6)$, dapatkan

(i) the distance between A and B.

jarak antara A dan B.

(ii) the midpoint of A and B.

titik tengah antara A dan B.

(4M)

(b) (i) Find the equation of the straight line that passes through the point $(11, 13)$ and perpendicular to the line $y = -\frac{1}{4}x + 12$.

Dapatkan persamaan garis lurus yang melalui titik $(11,13)$ dan serenjang dengan garis $y = -\frac{1}{4}x + 12$.

(ii) Find the equation of the straight line that passes through the point $(-8, 12)$ and parallel to the line $y = -8x + 6$.

Dapatkan persamaan garis lurus yang melalui titik $(-8,12)$ dan selari dengan garis $y = -8x + 6$.

(6M)

4. (a) Find the values of *m*.

Dapatkan nilai-nilai m.

(i) $50m - 20 = -4(m - 12)$

(ii) $(8m - 2)(6m + 7) = 0$

(4M)

(b) Solve the quadratic equation by using the formula. Give your answer to two decimal places.

Selesaikan persamaan kuadratik dengan menggunakan rumus. Berikan jawapan anda kepada dua tempat perpuluhan.

$$6x^2 - 7x - 8 = 0$$

(3M)

5. **(a)** **Change the angle $\frac{6}{18}\pi$ radian to degrees.**

Tukarkan sudut $\frac{6}{18}\pi$ *radian kepada darjah.*

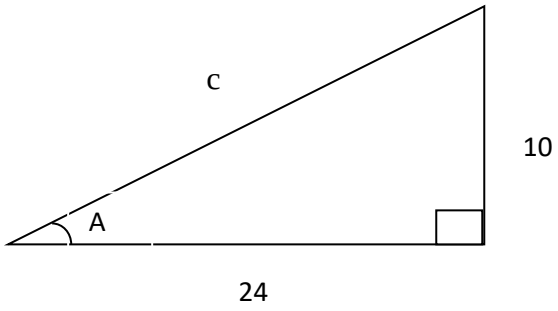
(b) **Change the angle $900°$ to radian in π form.**

Tukarkan sudut $900°$ *kepada radian dalam sebutan* π**.**

(4M)

(c) **Given a right triangle in Figure 1. Find the value of *c* by using the Pythagoras theorem. Hence, find $\sin A$, $\cos A$ and $\tan A$.**

Diberi suatu segitiga tepat dalam Rajah 1. Dapatkan nilai c dengan menggunakan teorem Pythagoras, seterusnya dapatkan sin *A,* kos *A dan* tan *A***.**



(5M)

Figure 1/*Rajah 1*

6. **Sketch the following graphs:**

Lakarkan graf-graf berikut:

(a) $y = -4x + 12$ **(b)** $y = 6x^2 - 10$

(4M)

7. **(a)** **Given**

Diberi

$$\begin{pmatrix} x & 2 \\ 26 & y - 3x \end{pmatrix} = \begin{pmatrix} 26 & 2 \\ 26 & 18 \end{pmatrix}$$

find the values of x and y.

dapatkan nilai-nilai bagi x dan y.

(2M)

(b) Given the following matrices, find:

Diberi matriks berikut, dapatkan:

$$\boldsymbol{A} = \begin{pmatrix} \mathbf{5} & \mathbf{8} \\ \mathbf{2} & \mathbf{1} \\ \mathbf{4} & \mathbf{7} \end{pmatrix} \qquad \boldsymbol{B} = \begin{pmatrix} \mathbf{12} & \mathbf{11} \\ \mathbf{10} & \mathbf{9} \\ \mathbf{1} & \mathbf{0} \end{pmatrix}$$

(i) $\mathbf{8}(\boldsymbol{A} + \boldsymbol{B})$ **(ii)** $\mathbf{3}\boldsymbol{A} + \mathbf{2}\boldsymbol{B}$

(2M)

(c) Given the following matrices, find:

Diberi matriks berikut, dapatkan:

$$\boldsymbol{C} = \begin{pmatrix} \mathbf{2} & \mathbf{5} \\ \mathbf{6} & \mathbf{8} \\ \mathbf{1} & \mathbf{3} \end{pmatrix} \qquad \boldsymbol{D} = \begin{pmatrix} \mathbf{1} & \mathbf{0} & \mathbf{2} \\ \mathbf{4} & \mathbf{2} & \mathbf{3} \end{pmatrix}$$

(i) $\mathbf{3}\boldsymbol{D}\boldsymbol{C}$ **(ii)** $\boldsymbol{C}\boldsymbol{D}$

(4M)

(d) Find the inverse of $\boldsymbol{E} = \begin{pmatrix} \mathbf{-3} & \mathbf{-8} \\ \mathbf{2} & \mathbf{10} \end{pmatrix}$**.**

Dapatkan songsangan bagi $E = \begin{pmatrix} -3 & -8 \\ 2 & 10 \end{pmatrix}$**.**

(2M)

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

LIST OF FORMULAE / *SENARAI RUMUS*

1. Rules of Index:

$a^m a^n = a^{m+n}$

$\left(a^m\right)^n = a^{mn}$

$\frac{a^m}{a^n} = a^{m-n}$

$\frac{1}{a^n} = a^{-n}$

2. Rules of Logarithms:

$\log_a(xy) = \log_a x + \log_a y$

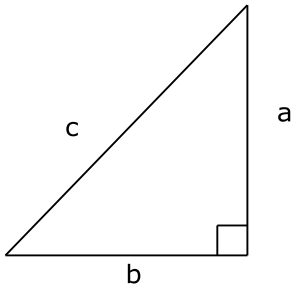
$\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$

$\log_a x^n = n\log_a x$

3. Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

4. Pythagoras theorem:



$c^2 = a^2 + b^2$

5. Geometry Coordinates:

Distance $= \sqrt{\left(x_2 - x_1\right)^2 + \left(y_2 - y_1\right)^2}$

Area $A = \frac{1}{2}\left|\left(x_1y_2 + x_2y_3 + x_3y_1\right) - \left(x_2y_1 + x_3y_2 + x_1y_3\right)\right|$

Midpoint $M(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

Gradient $m = \left(\frac{y_1 - y_2}{x_1 - x_2}\right)$

Equation of lines: $y - y_1 = m(x - x_1)$

6. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ **,** $|A| = ad - bc$ **.**

7. Inverse matrix for $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ **is** $A^{-1} = \frac{1}{|A|}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$.