



١- (أ) في عملية برنولي العشوائية $\{X_n, n \geq 1\}$ بالبارامتر $p = 0.5$ إذا كان $X = X_1 + X_2$ ، $Y = X_2 + X_3$ أوجد توزيع المتغير العشوائي الثنائي (X, Y) ثم احسب الإحتمالات الآتية : $P(Y = 2), P(X + Y < 2)$

(ب) أوجد الدوال الهامشية في السؤال (١-أ) ثم احسب $E(Y|X = 1)$ ، $V(Y)$

٢- (أ) أثبت صحة العلاقة الآتية : $E[E(Y|X)] = E(Y)$ وحقق ذلك في السؤال (١) .

(ب) إذا كان : $X = X_1$ ، $Y = X_2 + X_3$ ، $Z = X_1 + X_2 + X_3$ في العملية العشوائية $\{X_n, n \geq 1\}$ بالبارامتر $p = 0.6$ احسب الإحتمالات الآتية : $P(Z > Y)$ ، $P(Z = X = 1)$

٣- (أ) في العملية العشوائية $\{Y_n, n \geq 0\}$ حيث $Y_n = \sum_{i=1}^n X_i$ أوجد $E(Y_3^2)$ ثم احسب الإحتمالات : $P(Y_3 = 3, Y_5 = 4, Y_7 = 7)$ ، $P(Y_5 = 3, Y_7 = 4, Y_{10} = 6)$

(ب) - لأي وضع من الأوضاع الممكنة : $s, s, f, f, f, s, s, s, f$ في عملية برنولي العشوائية عرف عملية أزمنة النجاح $\{T_k, k \geq 1\}$ موضحا ذلك بمثال واذكر فقط توزيع المتغير T_k

٤- (أ) في عملية بواسون العشوائية $\{N_t, t \geq 0\}$ بالمعدل $\lambda = 4$ أوجد الإحتمالات الآتية : $P(N_{0.5} = 2, N_{1.5} = 4), P(N_{0.5} = 2)$

(ب) - في عملية بواسون العشوائية أو عملية الوصول المعدودة أوجد الإحتمال المشروط لعدد الوصول N_t بالنسبة لعدد الوصول N_{t+s} حيث $t > 0$ ، $s > 0$ واذكر ملاحظتك على النتيجة .

٥- (أ) أثبت أن الأزمنة بين الوصول في عملية بواسون العشوائية أو عملية الوصول المعدودة بالبارامتر λt تمثل متغيرات عشوائية مستقلة تخضع لتوزيع الدالة الأسية بالبارامتر λ

(ب) - عرف عملية التجديد موضحا العلاقة بينها وبين عملية الوصول المعدودة وبفرض أن : $F_n(t) = P(R_n \leq t)$ ، N_t هو عدد الوصول أثبت أن : $P(N_t = n) = F_n(t) - F_{n+1}(t)$

٦- (أ) عرف سلاسل ماركوف العشوائية المتقطعة ثم اوجد صيغة للإحتمال : $P(X_0 = x_0, X_1 = x_1, \dots, X_n = x_n)$ من خلال دالة الكتلة الإحتمالية للمتجه العشوائي المتقطع $(X_0, X_1, X_2, \dots, X_n)$

(ب) في إحدى المناطق الساحلية بفرض أن إحتمال أن يكون أي يوم ممطر خلال الأسبوع يساوي $1/3$ وإحتمال أن يكون أي يوم ممطر يسبقه يوم جاف يساوي $1/3$ ، إحتمال أن يكون أي يوم جاف يسبقه يوم جاف يساوي $1/2$ أوجد إحتمال أن يكون يومان متتاليان خلال الأسبوع متماثلين أوجد كذلك أن يكون اليوم الثالث في الأسبوع جاف علما بأن اليوم الأول ممطر .



جامعة أسيوط - كلية العلوم

الفصل الدراسي الثاني 2022 / 2023	ساعات معتمدة	الزمن: ساعتان
المقرر: 316 ز تصميم تجارب		مرحلة البكالوريوس
لجنة الممتحنين: أ.د. عاطف أبوا لوفاحمد		المراجع الداخلي: أ.د. باهى راغب بخيت
أ.د. عادل محمد محمود	(الأسئلة في 3 صفحات)	

السؤال الأول (25 درجة): ضع علامة (✓) أمام العبارة الصحيحة وعلامة (X) أمام العبارة الخاطئة:

- 1- عدد التفاعلات الثلاثية هو $\frac{n(n-1)(n-2)}{6}$ () .
- 2- النموذج الرياضي لأي تصميم يوضح مصادر الاختلاف في البيانات الناتجة () .
- 3- الوحدة التجريبية هي أصغر وحدة أو قسم يستقبل أحد معاملات التجربة () .
- 4- عدد الوحدات التجريبية في تصميم LS هو t^2 وتظهر المعاملة مرة واحدة في أي صف أو عمود () .
- 5- $Total SS = \sum_{i=1}^n (X_i - \bar{X})^2$ () .
- 6- يستخدم تحليل التباين باختبار F لمقارنة تأثير معاملتين أو أكثر () .
- 7- يُقدر الانحراف القياسي لمقارنة الفرق بين متوسطي أي معاملتين من $S_{\bar{a}} = \sqrt{\frac{2MS Error}{r}}$ () .
- 8- يُطبق تحويل البيانات قبل تحليلها عندما لا تتوزع طبيعياً حول متوسطها () .
- 9- يُحدد تجانس الوحدات التجريبية نوع التصميم التجريبي المستخدم في التجربة.
- 10- يحسب الانحراف القياسي للمجتمع بطريقة التربيع من $\sigma = \sqrt{[(\sum X^2 - (\sum X)^2/n)/n]}$ () .
- 11- يُقدر التفاعل AB من المعادلة $SS(AB) = [\frac{\sum X_{ij}^2}{r} - C.F.] - SS_A - SS_B$ () .
- 12- عدد المعاملات المناسب في تصميم LS هو 3-8 () .
- 13- تُقدر درجات حرية Main plot (M.P.) في تحليل Split plot من ar-1 () .
- 14- يزيد التكرار المتخفي Hidden Replication من دقة نتائج تحليل بيانات التجربة العاملية () .
- 15- النموذج الرياضي لتجربة Split plot في RCBD هو $X_{ijk} = \mu + A_i + R_k + \epsilon_{ik} + B_j + AB_{ij} + \delta_{ijk}$ () .
- 16- لصلاحية تحليل Split plot يجب أن يكون $MS Error B < MS Error A$ () .
- 17- يتم تطبيق التوزيع العشوائي في ثلاثة مراحل في تحليل Split Plot () .
- 18- يُقدر $SS Error B$ في نظام Split plot من $Total SS - MP SS - B SS - AB SS$ () .
- 19- التجارب العاملية ليست تصميم تجريبي جديد، كما أن عدد مستويات العوامل يحدد نوعها () .
- 20- عدد الوحدات التجريبية في تجربة عاملية 3×5 مع استعمال 4 مكررات هو 60 وحدة تجريبية () .
- 21- تضم أي مكررة في التجربة العاملية جميع المعاملات التوافقية لعوامل الدراسة () .

- 22- قيمة التفاعل غير معنوية في تجربة 2^2 إذا كان $F_{0.05} = 5.1$; $MS Error = 3.33$; $AB SS = 9.99$ () .
- 23- يكون الاتجاه الخطي Linear للعامل A معنوي إذا كانت $A_1 = 36$, $A_2 = 46$, $A_3 = 88$, $A_4 = 40$ وأن المعاملات هي 3 1 1 3 - على الترتيب بمعلومية كل من $F_{0.05} = 4.14$, $b = 3$, $r = 4$, $MS Error = 2.62$ () .
- 24- عدد التفاعلات من الدرجة الثانية في تجربة عاملية 3^5 هو 10 () .
- 25- بمعلومية كل من: $\sum xy = 33$, $\sum x^2 = 10$, $\sum y^2 = 110$, $\sum X = 15$, $\sum Y = 60$, $n = 5$ فإن $\hat{Y} = 2.1 + 3.3X$; $R = r^2 = 0.99$ () .

السؤال الثاني (25 درجة): أكمل الجداول التالية:

1- إذا علمت أن $a = 3$, $b = 4$, $r = 4$ (5 درجات)

S.O.V.	d.f.	SS	MS	F cal.	F tab.(0.05)
Replicates		30			
A		26			3.29
B			28		2.89
AB			4		2.39
Error					
Total		214			

2- إذا علمت أن $a = 3$, $b = 2$, $r = 4$ (5 درجات)

S.O.V.	d.f.	SS	MS	F cal.	F tab.(0.05)	F tab.(0.01)
Rep.			18.56		4.76	9.78
A		148			5.14	10.92
E.a					-	-
M.P.		244	-		-	-
B			228.17		5.12	10.56
AB			8.17		4.26	8.02
E.b				-		
Total		510	-	-		

7²

3- إذا علمت أن $r=5$ ومجموع قيم المُعاملات هو (114, 142, 175, 191, 214) على الترتيب وأن مُعاملات منحنيات الاستجابة هي:

$$\begin{matrix} T_L & -2 & -1 & 0 & 1 & 2 \\ T_Q & 2 & -1 & -2 & -1 & 2 \end{matrix}$$

(5 درجات)

S.O.V.	d.f.	SS	MS	F cal.	F tab. (0.05)
Treatments					2.87
T_L					4.35
T_Q					
$T_{Dev.}$	2				3.49
Error	20		17.38		
Total		1604.16	-		

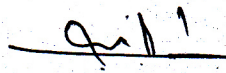
4- اشرح فروض تحليل التباين موضحاً أنواع العينات في التجارب؟ (5 درجات).

5- بماذا تشير كل من z test ; Bartlett test ; $4*5$; 4^5 ; $(a-1)(b-1)(c-1)$; (1) ; $b-1$; a ; A ؟

Main and sub Plot ؟ (5 درجات).

انتهت الأسئلة

مع التمنيات بالتوفيق،



لجنة الممتحنين: أ.د. عاطف أبوالوفا احمد

د. ص

أ.د. عادل محمد محمود



المراجع الداخلي: أ.د. باهى راغب بخيت



المقرر: نظرية الحلقات والحقول (٣٢٢)
المستوى: الثالث
الدرجة الكلية: ٥٠ درجة
درجتان عن كل فقرة
زمن وتاريخ الامتحان: ساعتان

قسم الرياضيات
كلية العلوم
جامعة أسيوط
الفصل الثاني ٢٠٢٣

أولا: أختار المناسب من بين (a), (b), (c) لكل فقرة من الفقرات التالية:-

بفرض أن $(R, *, \circ)$ نظام جبري حيث $a * b = a + b - 1$ and $a \circ b = a + b - ab, \forall a, b \in R$ فإن

١- المحاييد الجمعي =

- a) 1 b) 2 c) 0

٢- المحاييد الضربي =

- a) 1 b) 2 c) 0

٣- المعكوس الجمعي للعنصر 0 =

- a) 1 b) 2 c) 0

٤- المعكوس الضربي للعنصر 2 =

- a) 1 b) 2 c) 0

بالنسبة للنظام الجبري $(\mathbb{Z}_7, +, \cdot)$ يكون

٥- المحاييد الجمعي =

- a) [1] b) [2] c) [0]

٦- المعكوس الجمعي للعنصر [2] =

- a) [3] b) [4] c) [5]

٧- المعكوس الضربي للعنصر [3] =

- a) [3] b) [4] c) [5]

٨- $[-19] +_7 [16] =$

- a) [3] b) [4] c) [5]

٩- $[-19] \cdot_7 [16] =$

- a) [3] b) [4] c) [5]

١٠- $x \Leftarrow [x]^{-1} = [23] \cdot_7 [24]^{-1} =$

- a) [3] b) [4] c) [5]

بقية الأسئلة خلف الورقة

انيا:أختر الفقرة a(True) متى كانت العبارة صحيحة أو b(False) متى كانت خطأ.

1- الحلقة $(2Z, +, .)$ مثالية للحلقة $(Z, +, .)$.

(a) True

(b) False

٢- النظام الجبري $(N, +, .)$ حلقة جزئية من الحلقة $(Z, +, .)$.

(a) True

(b) False

٣- أي عملية ثنائية توزيعية على نفسها.

(a) True

(b) False.

٤- $(Z_n, +_n, .)_n$ هي حلقة أبدالية بمحايد متى كانت n عددا أوليا.

(a) True

(b) False

٥- النظام $(Z_7, +_7, ._7)$ حلقة تامة .

(a) True

(b) False

٦- الحلقة $(R \times R, +, .)$ خالية من قواسم الصفر حيث

$$(a, b) + (c, d) = (a + c, b + d), (a, b) \cdot (c, d) = (a \cdot c, b \cdot d) \forall a, b, c \in R$$

(a) True

(b) False

٧- كل حقل هو حلقة تامة .

(a) True

(b) False

٨- كل حلقة تامة هي حقل.

(a) True

(b) False

٩- المحاييد الضربي في الحقل وحيد .

(a) True

(b) False

١٠- للحلقة على الأقل مثالية بديهية .

(a) True

(b) False

١١- $(H, +_{12}, ._{12})$ مثالية بالنسبة للحلقة $(Z_{12}, +_{12}, ._{12})$ حيث $H = \{[0], [4], [8]\}$.

(a) True

(b) False

١٢- اتحاد حلقتين جزئيتين عامة حلقة .

(a) True

(b) False

١٣- تقاطع حلقتين جزئيتين عامة حلقة .

(a) True

(b) False

١٤- $(F, .)$ قد تكون زمرة حيث $(F, +, .)$ حقل.

(a) True

(b) False

١٥- قد يكون النظام $(P(X), \cup, \cap)$ حلقة .

(a) True

(b) False

With my best wishes

Prof. Dr. Ahmed Allam



المقرر: نظرية الحلقات والحقول (٣٢٢ ر)
المستوى: الثالث
الدرجة الكلية: ٥٠ درجة
درجتان عن كل فقرة
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قسم الرياضيات
كلية العلوم
جامعة أسيوط
الفصل الثاني ٢٠٢٣

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٤- المعكوس الضربي للعنصر 2 =

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بالنسبة للنظام الجبري $(\mathbb{Z}_7, +, \cdot)$ يكون

٥- المحاييد الجمعي =

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٧- المعكوس الضربي للعنصر [3] =

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٩- $[-19] \cdot_7 [16] =$

- a) [3] b) [4] c) [5]

١٠- $x \Leftarrow [x]^{-1} = [23] \cdot_7 [24]^{-1} =$

- a) [3] b) [4] c) [5]

بقية الأسئلة خلف الورقة

ثانياً: اختر الفقرة (True) a متى كانت العبارة صحيحة أو (False) b متى كانت خطأ.

١- الحلقة $(2Z, +, .)$ مثالاً للحلقة $(Z, +, .)$.

(a) True

(b) False

٢- النظام الجبري $(N, +, .)$ حلقة جزئية من الحلقة $(Z, +, .)$.

(a) True

(b) False

٣- أي عملية ثنائية توزيعية على نفسها.

(a) True

(b) False.

٤- $(Z_n, +_n, \cdot_n)$ هي حلقة أبدالية بمحايد متى كانت n عدداً أولياً.

(a) True

(b) False

٥- النظام $(Z_7, +_7, \cdot_7)$ حلقة تامة.

(a) True

(b) False

٦- الحلقة $(R \times R, +, .)$ خالية من قواسم الصفر حيث

$$(a, b) + (c, d) = (a + c, b + d), (a, b) \cdot (c, d) = (a \cdot c, b \cdot d) \forall a, b, c \in R$$

(a) True

(b) False

٧- كل حقل هو حلقة تامة.

(a) True

(b) False

٨- كل حلقة تامة هي حقل.

(a) True

(b) False

٩- المحايد الضربي في الحقل وحيد.

(a) True

(b) False

١٠- للحلقة على الأقل مثالاً بديهية.

(a) True

(b) False

١١- $(H, +_{12}, \cdot_{12})$ مثالاً بالنسبة للحلقة $(Z_{12}, +_{12}, \cdot_{12})$ حيث $H = \{[0], [4], [8]\}$.

(a) True

(b) False

١٢- اتحاد حلقتين جزئيتين عامة حلقة.

(a) True

(b) False

١٣- تقاطع حلقتين جزئيتين عامة حلقة.

(a) True

(b) False

١٤- $(F, +, .)$ قد تكون زمرة حيث $(F, +, .)$ حقل.

(a) True

(b) False

١٥- قد يكون النظام $(P(X), \cup, \cap)$ حلقة.

(a) True

(b) False

With my best wishes

Prof. Dr. Ahmed Allam

Answer five question only from the following questions

1-(10 points) Find $\sup(A)$, $\inf(A)$, $\text{Max}(A)$ and $\text{Min}(A)$, where:

$$(i) A = \left\{ x \in \mathbb{R} \mid x < \frac{1}{x} \right\} \quad (ii) A = \left\{ \frac{1}{m} + \frac{1}{n} \mid n, m \in \mathbb{N} \right\} \quad (iii) A = \left\{ -\left(\frac{n+1}{n}\right) \mid n \in \mathbb{N} \right\}$$

$$(iv) A = \{x \in \mathbb{R} \mid x^2 < 5\} \quad (v) A = \{x \in \mathbb{R} \mid |x+4| < 3\}$$

2-(10 Points). Prove that (a_n) given by :

$$a_{n+1} = \sqrt{3 a_n}, \quad a_1 = 1$$

is convergent.

3-(10 points) Find the $\lim$ and $\lim$ of the sequences

$$(i) \left\{ 4 + \cos \frac{n\pi}{2} \right\} \quad (ii) \left\{ \frac{1 + (-1)^n}{n} \right\} \quad (iii) \left\{ \sin \frac{n\pi}{3} \right\}$$

4-(10 points). Determine the given series converges. If so find the sum of the series

$$(a) \sum_{n=1}^{\infty} \left(\cos \frac{1}{n} - \cos \frac{1}{n+1} \right) \quad (b) \sum_{n=1}^{\infty} \frac{1}{(2n-1)(2n+1)}$$

5-(10 points) Test the convergence or divergence of the series :

$$(a) \sum_{n=1}^{\infty} \left(\frac{n}{2n+1} \right)^n \quad (b) \sum_{n=1}^{\infty} \frac{n^2+1}{n^{n-1}}$$

6- Let $f(x)$ be a function defined as :

$$f(x) = \begin{cases} x \sin \frac{1}{x} & , x \neq 0 \\ 0 & , x = 0 \end{cases}$$

Find : $D^+ f(0)$, $D_- f(0)$, $D^- f(0)$ and $D f(0)$.

7-Let $f: [0, b] \rightarrow \mathbb{R}$, $f(x) = x^2$, $0 \leq x < b$ Show that $f \in R[a, b]$ and

$$\int_0^b f(x) dx = \int_0^b x^2 dx = \frac{b^3}{3}$$

جامعة اسيوط امتحان الفصل الدراسي الثاني لعام ٢٠٢٢/٢٠٢٣ الزمن : ثلاث ساعات
كلية العلوم لطلاب كلية العلوم- المستوى الثالث الدرجة الكلية : ٥٠ درجة
قسم الرياضيات المادة : معادلات تفاضلية جزئية ودوال خاصة كود المقرر / ٣١٨ ر

اجب عن خمسة اسئلة فقط من الاسئلة الاتية : (١٠ درجات لكل سؤال)

١- (i) احذف الدالة الاختيارية f من العلاقة الاتية : $f(x - 2y + 3z, x^2 - y^2) = 0$

(ii) اوجد الحل العام والحل الكامل للمعادلة : $(x^2 - y^2 - z^2)p + 2xyq = 2xz$

ثم اوجد الحل الخاص لهذه المعادلة المار بالمنحنى $z = 1, x = y$

٢- اوجد الحل العام لكل من المعادلتين التفاضليتين الجزئيتين الاتيتين :-

$$(D_1^2 - 4D_2^2)z = (x + y)^2 \quad (i)$$

$$(D_1^2 - 2D_1D_2 - 3D_2^2)z = \frac{1}{x-y} \quad (ii)$$

٣- اوجد الحل العام لكل من المعادلتين التفاضليتين الجزئيتين الاتيتين :-

$$(D_1^2 + 2D_1D_2 + D_2^2 + 3D_1 + 3D_2)z = e^{x-y} \quad (i)$$

$$(D_1 - D_2^2)z = \cos(x + 2y) \quad (ii)$$

٤- (i) اثبت ان $\Gamma(m + n) B(m, n) = \Gamma(m) \Gamma(n)$

(ii) احسب قيمة اثنين فقط من التكاملات الاتية :-

$$(a) \int_0^1 \frac{1}{\sqrt{1-x^n}} dx \quad (b) \int_0^{\frac{\pi}{2}} \sqrt{\tan x} dx \quad (c) \int_0^{\infty} \frac{1}{x^{\frac{5}{6}}(1+x)^2} dx$$

٥- (i) اثبت ان $J_{n+1}(x) = \frac{2n}{x} J_n(x) - J_{n-1}(x)$

(ii) اثبت ان $J_{\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}} \sin x$ واذا علمت ان $J_{-\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}} \cos x$ فاوجد $J_{\frac{3}{2}}(x)$

٦- (i) اثبت ان $P_n(x) = \frac{1}{2^n n!} \frac{d^n}{dx^n} (x^2 - 1)^n$ تحقق معادلة لجندر التفاضلية

(ii) اوجد قيمة اثنين فقط من التكاملات الاتية :-

$$(a) \int_{-1}^1 x P_n(x) P_{n+1}(x) dx \quad (b) \int_{-1}^1 P_n(x) P_{n+1}(x) dx \quad (c) \int_{-1}^1 x^4 P_2(x) dx$$

د/مجدي كامل الجندي

مع اطيب الامنيات بالتوفيق و النجاح

	Assiut University Faculty of Computers & Information Computer Science Department	Course Name:	Artificial Intelligence	 كلية الحاسبات والمعلومات
		Course ID:	MC352 (Faculty of Science)	
		Duration:	2 Hours	
		Date:	30/5/2023	
		Academic Year:	2022-2023	
		Semester: ☐ 1 st ☒ 2 nd ☐ Summer		

Final Exam

Q1: True or False.

1.	The intelligent agent can be considered that perceives its environment through effectors and interacts with it through its sensors to achieve maximum progress toward its goals.
2.	Cognitive science is studied through theories and experimental evidence to model the internal activities of the human brain in order to reach artificial intelligence through thinking humanly.
3.	A model-based reflex agent becomes a goal-based agent if it keeps track of its goals and its environment and selects actions that lead to achieving its goals.
4.	Teaching the robot how to walk without colliding with the objects of the surrounding environment does not require artificial intelligence programming.
5.	The model-based reflex agent cannot be upgraded to the utility-based agent.
6.	The simple reflex agent is more complex than the utility-based agent.
7.	Machine learning is programming computers to improve their performance without using data models or even previous experiments.
8.	When designing the intelligent agent to program the windshield wiper for cars, a vision camera can act as the agent's sensor.
9.	No tipping at the end of the trip gives the smart taxi agent an indication that he did something wrong, and this is a kind of reinforcement learning.
10.	The main objective of the rational agent is to do the right thing that is required of him.
11.	The taxi agent may gradually develop himself to identify: "good traffic days" and "bad traffic days", without the teacher giving him training examples is an application of supervised learning methods.
12.	Artificial intelligence is the science and engineering of making and programming intelligent machines that can perform tasks that do not necessarily require intelligence when performed by humans.
13.	The intelligent agent is a set of intelligent software only.
14.	A* search can find the optimal solution occasionally.
15.	Greedy search expands the node that appears to be closest to goal.
16.	A genetic algorithm is a variant of stochastic beam search.
17.	Simulated annealing is a controlled random-walk algorithm.
18.	A hill-climbing algorithm may accept downhill moves.
19.	The path cost determines whether a given state is a goal or not.
20.	The search strategy that always finds a solution, not necessarily the best, if one exists is called optimal.

Q2: Choose the best answer.

21.	"The art of creating machines that perform functions that require intelligence when performed by people". The previous definition of AI is about			
	a. thinking humanly	b. acting humanly	c. thinking rationally	d. acting rationally
22.	"To what extent is the agent able to make decisions and actions on its own" is the degree of			
	a. autonomy	b. mobility	c. rationality	d. social ability
23.	If the environment can change while an agent is deliberating, then we say the environment is			
	a. discrete	b. non-episodic	c. dynamic	d. stochastic
24.	What is the learning agent component that is responsible for suggesting exploratory actions that will lead to new and informative experiences?			
	a. performance element	b. learning element	c. critic	d. problem generator
25.	The search strategy that always finds a solution (not necessarily the best) if one exists is called			
	a. complete	b. optimal	c. Both a & b	d. None of previous
26.	The uniform-cost search strategy is implemented by a frontier that is a queue in ascending order by path cost.			
	a. priority	b. FIFO	c. LIFO	d. stack
27.	"Studying and formalizing common sense facts about the world and the problems that the world presents to the achievement of goals." This means doing AI research through methodology.			
	a. phenomenal	b. biological	c. theoretical	d. experimental



28.	“Studying and formalizing common sense facts about the world and the problems that the world presents to the achievement of goals.” This means doing AI research through methodology.			
	a. phenomenal	b. biological	c. theoretical	d. experimental
29.	“Conflict resolution based on some if-then rules” means: mechanism.			
	a. Compromise	b. Arbitrate	c. Override	d. Combination
30.	“Conflict resolution based on choosing an action that satisfies both agents” means: mechanism.			
	a. Compromise	b. Arbitrate	c. Override	d. Combination
31.	The Turing test is one of the applications of defining artificial intelligence in terms of:			
	a. Thinking Humanly	b. Thinking Rationally	c. Acting Humanly	d. Acting Rationally
32.	The rational agent is one of the applications of defining artificial intelligence in terms of:			
	a. Thinking Humanly	b. Thinking Rationally	c. Acting Humanly	d. Acting Rationally
33.	Defining artificial intelligence through concepts and laws of thought is classified as:			
	a. Thinking Humanly	b. Thinking Rationally	c. Acting Humanly	d. Acting Rationally
34.	Conflict resolution in systems with multiple intelligent agents using some condition rules is classified as:			
	a. Override mechanism	b. Arbitrate mechanism	c. Compromise mechanism	d. Combination mechanism
35.	Conflict resolution in systems with multiple intelligent agents by giving priority to one agent over the other agents is:			
	a. Override mechanism	b. Arbitrate mechanism	c. Compromise mechanism	d. Combination mechanism
36.	Conflict resolution in systems with multiple intelligent agents by choosing an action that satisfies all agents, classified as:			
	a. Override mechanism	b. Arbitrate mechanism	c. Compromise mechanism	d. Combination mechanism
37.	The intelligent agent who chooses the action that will lead to achieving its goal is called:			
	a. Simple reflex agent	b. Model-based reflex agent	c. Goal-based agent	d. Utility-based agent
38.	The Intelligent Agent, who chooses the action that will lead to the preservation of its resources is called:			
	a. Simple reflex agent	b. Model-based reflex agent	c. Goal-based agent	d. Utility-based agent
39.	If the environment is change while the intelligent agent deals with it, then we say that the environment is:			
	a. Discrete	b. Non-episodic	c. Dynamic	d. Stochastic
40.	If the environment can change in a way that cannot be determined or known, then the environment is named:			
	a. Discrete	b. Non-episodic	c. Dynamic	d. Stochastic
41.	The branch of artificial intelligence that is concerned with designing and studying algorithms that improve their performance in some tasks through experimentation and using examples is called:			
	a. Optimal Search	b. Expert Systems	c. Local Search	d. Machine Learning
42.	The branch of artificial intelligence that is concerned with designing and studying algorithms that work to find the overall best solution among the various search alternatives:			
	a. Optimal Search	b. Expert Systems	c. Local Search	d. Machine Learning
43.	The machine learning method in which the intelligent agent observes some examples of input-output pairs and learns how the inputs are transformed into outputs is called:			
	a. Supervised Learning	b. Unsupervised Learning	c. Semi-supervised Learning	d. Reinforcement Learning
44.	The machine learning method in which the intelligent agent learns through a series of rewards or punishments is:			
	a. Supervised Learning	b. Unsupervised Learning	c. Semi-supervised Learning	d. Reinforcement Learning
45.	A machine learning method in which the intelligent agent learns patterns in the inputs even though no explicit learning examples are provided is called:			
	a. Supervised Learning	b. Unsupervised Learning	c. Semi-supervised Learning	d. Reinforcement Learning
46.	The machine learning method in which the intelligent agent learns by providing some examples with contain pairs of inputs and outputs and some other examples that only have inputs, called:			
	a. Supervised Learning	b. Unsupervised Learning	c. Semi-supervised Learning	d. Reinforcement Learning
47.	Mate probabilistically chosen parents from the intermediate population.			
	a. Parent Selection	b. Crossover	c. Mutation	d. Survival Selection
48.	Select an intermediate population from the current one.			
	a. Parent Selection	b. Crossover	c. Mutation	d. Survival Selection
49.	Copy members from the current generation to the next one.			
	a. Parent Selection	b. Crossover	c. Mutation	d. Survival Selection
50.	Alter one or more genes of a probabilistically chosen chromosome.			
	a. Parent Selection	b. Crossover	c. Mutation	d. Survival Selection

End of Exam



	Assiut University Faculty of Science Mathematics Dept.	Final Exam 2022/2023 Image processing Code: MC366	8/6/2023 Level: 3 Time: 2 hours	
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Answer the following questions:

(50 Marks)

Q1: Shade a ,b, c, or d in the bubble sheet

(40 Marks)

1. Negative of the image having intensity values $[0, L-1]$ is expressed by.....

A	$s = L-1+r$	B	$s = L-1-r$	C	$s = L+1-r$	D	$s = L+1+r$
---	-------------	---	-------------	---	-------------	---	-------------

2. Smallest possible neighbourhood in an image must be of size.

A	4x4	B	3x3	C	2x2	D	1x1
---	-----	---	-----	---	-----	---	-----

3. Which is first fundamental step in image processing?

A	filtration	B	image acquisition	C	image enhancement	D	image restoration
---	------------	---	-------------------	---	-------------------	---	-------------------

4. In image we notice that the components of histogram are concentrated on the low side on intensity.

A	bright	B	colorful	C	dark	D	all of these
---	--------	---	----------	---	------	---	--------------

5. Histogram is the technique processed in.....

A	intensity domain	B	frequency domain	C	undefined domain	D	spatial domain
---	------------------	---	------------------	---	------------------	---	----------------

6. Method in which images are input and attributes are output is called.....processes

A	low level	B	edge level	C	high level	D	mid level
---	-----------	---	------------	---	------------	---	-----------

7. Sum of all components of a normalized histogram is equal to

A	0	B	1	C	2	D	None of these
---	---	---	---	---	---	---	---------------

8. The value ofis between 0 and 1. The larger the value, the better the robustness of the algorithm.

A	BER	B	PSNR	C	BCR	D	A and C
---	-----	---	------	---	-----	---	---------

9. A 1024-level image is called aimage.

A	8-bit	B	9-bit	C	10-bit	D	11-bit
---	-------	---	-------	---	--------	---	--------

10. Which of the following involves reversing the intensity levels of an image?..... Transformations

A	Piecewise Linear	B	Log	C	Negative	D	Power Law
---	------------------	---	-----	---	----------	---	-----------

11. The general form of log transformations is

A	$s = c + \log(1 + r)$	B	$s = c \cdot \log(1 - r)$	C	$s = c \cdot \log(1 - r)$	D	$s = c \cdot \log(1 + r)$
---	-----------------------	---	---------------------------	---	---------------------------	---	---------------------------

12. is example of Low level of image processing operations

A	edges extraction	B	regions	C	contrast enhancement	D	extraction of attributes
---	------------------	---	---------	---	----------------------	---	--------------------------

13. The used to evaluate the robustness of watermarking.

A	BCR	B	PSNR	C	A and D	D	BER
---	-----	---	------	---	---------	---	-----

14. The output of a smoothing, linear spatial filtering is a of the pixels contained in the neighbourhood of the filter mask.

A	Average	B	Dot product	C	Sum	D	Median
---	---------	---	-------------	---	-----	---	--------

15. Used to ...the pixel contents from two images or to add a constant value to an image's pixel values.

A	additive image offset	B	additive noise	C	blend	D	negative of an image
---	-----------------------	---	----------------	---	-------	---	----------------------

16. Which of the following is a linear filter in image processing?

A	Median	B	Gaussian	C	Bilateral	D	Laplacian
---	--------	---	----------	---	-----------	---	-----------

17. Which of the following is a point operator in image processing?

A	Median filter	B	Sobel filter	C	Bilateral filter	D	Histogram equalization
---	---------------	---	--------------	---	------------------	---	------------------------

18. Which of the following is a non-linear filter in image processing?

A	Gaussian filter	B	Mean filter	C	Laplacian filter	D	Median filter
---	-----------------	---	-------------	---	------------------	---	---------------

19. Which of the following is an example of neighborhood operation?

A	filtering	B	invert	C	darken	D	lighten
---	-----------	---	--------	---	--------	---	---------

20. Inserting data on to the images is called image....

A	equalization	B	compression	C	watermarking	D	encryption
---	--------------	---	-------------	---	--------------	---	------------

21.is the general form of the power-law transformation

A	$c = sr^v$	B	$s = cr^v$	C	$s = rc^v$	D	None of these
---	------------	---	------------	---	------------	---	---------------

22. Thefunction is the trivial case in which the input and output intensities are identical.

A	power	B	identity	C	log	D	frequency
---	-------	---	----------	---	-----	---	-----------

23. Theis used to evaluate the watermark invisibility.
- | | | | | | | | |
|---|------|---|-----|---|-----|---|----|
| A | PSNR | B | BER | C | BCR | D | NC |
|---|------|---|-----|---|-----|---|----|
24. The imageshows the distribution of image pixel values.
- | | | | | | | | |
|---|-----------|---|---------|---|-------------|---|---------------|
| A | histogram | B | entropy | C | correlation | D | None of these |
|---|-----------|---|---------|---|-------------|---|---------------|
25.Level: Segmentation (partitioning an image into regions or objects)
- | | | | | | | | |
|---|-------|---|-----|---|------|---|-----|
| A | First | B | Low | C | High | D | Mid |
|---|-------|---|-----|---|------|---|-----|
26. For a 5-bit image, negative transformation of an image is expressed by
- | | | | | | | | |
|---|--------------|---|--------------|---|--------------|---|--------------|
| A | $s = 33 - r$ | B | $s = r - 31$ | C | $s = r - 33$ | D | $s = 31 - r$ |
|---|--------------|---|--------------|---|--------------|---|--------------|
27. Which of the following is a technique used for image enhancement?
- | | | | | | | | |
|---|---------------|---|-------------------|---|---------------------|---|---------|
| A | Median filter | B | Fourier transform | C | Contrast stretching | D | A and B |
|---|---------------|---|-------------------|---|---------------------|---|---------|
28. Range $[0, L-1]$, where L is the.....
- | | | | | | | | |
|---|--------------|---|--------|---|------------------------|---|-------------|
| A | no of levels | B | length | C | No of intensity levels | D | No. of bits |
|---|--------------|---|--------|---|------------------------|---|-------------|
29. Image.....converts the actual information into a meaningless structure.
- | | | | | | | | |
|---|-------------|---|---------------|---|------------|---|--------------|
| A | compression | B | steganography | C | encryption | D | watermarking |
|---|-------------|---|---------------|---|------------|---|--------------|
30. Histogram equalization refers to image....
- | | | | | | | | |
|---|--------------|---|---------------|---|----------|---|----------|
| A | quantization | B | normalization | C | sampling | D | matching |
|---|--------------|---|---------------|---|----------|---|----------|
31. Level: Primitive operations (e.g., noise reduction, contrast enhancement, etc.)
- | | | | | | | | |
|---|-------|---|-----|---|------|---|-----|
| A | First | B | Low | C | High | D | Mid |
|---|-------|---|-----|---|------|---|-----|
32. Therefers to the image plane itself.
- | | | | | | | | |
|---|------------------|---|---------------|---|--------------|---|----------------|
| A | frequency domain | B | hybrid domain | C | polar domain | D | spatial domain |
|---|------------------|---|---------------|---|--------------|---|----------------|
33. Intensity transformations operate on single pixels of an image for tasks such as image.....
- | | | | | | | | |
|---|-----------|---|------------|---|--------------|---|-----------|
| A | smoothing | B | sharpening | C | thresholding | D | filtering |
|---|-----------|---|------------|---|--------------|---|-----------|
34. Highlighting a specific range of intensities in an image often is desired.
- | | | | | | | | |
|---|-------------------|---|---------------------|---|--------------------|---|--------------|
| A | Intensity slicing | B | Contrast stretching | C | Intensity changing | D | Thresholding |
|---|-------------------|---|---------------------|---|--------------------|---|--------------|
35.is a graph indicating the number of times each grey level occurs in the image.
- | | | | | | | | |
|---|--------------------|---|-----------|---|----------|---|--------------|
| A | Histogram matching | B | Histogram | C | sampling | D | quantization |
|---|--------------------|---|-----------|---|----------|---|--------------|
36.is an image processing technique that adjusts the contrast of an image by using its histogram.
- | | | | | | | | |
|---|--------------------|---|---------------|---|---------------|---|------------------------|
| A | Histogram matching | B | Specification | C | Normalization | D | Histogram equalization |
|---|--------------------|---|---------------|---|---------------|---|------------------------|
37. It is the science of modifying digital images by means of a digital computer.
- | | | | | | | | |
|---|-------------------|---|------------------|---|-----------------|---|--------------------------|
| A | Image enhancement | B | Computer graphic | C | Computer vision | D | digital image processing |
|---|-------------------|---|------------------|---|-----------------|---|--------------------------|
38.an image to allow inspection of additional fine-grained details (better for human viewing)
- | | | | | | | | |
|---|--------------|---|--------------|---|----------|---|------------|
| A | Binarization | B | Segmentation | C | Blurring | D | Sharpening |
|---|--------------|---|--------------|---|----------|---|------------|
39. Reducing a grayscale image to only two levels of gray (black and white) is usually referred to as
- | | | | | | | | |
|---|--------------|---|------------|---|--------------|---|------------|
| A | Segmentation | B | deblurring | C | Binarization | D | sharpening |
|---|--------------|---|------------|---|--------------|---|------------|
40. Which of the following is a technique used for image enhancement?
- | | | | | | | | |
|---|------------------------|---|----------------|---|-----------------|---|---------------|
| A | Histogram equalization | B | edge detection | C | Gaussian filter | D | Median filter |
|---|------------------------|---|----------------|---|-----------------|---|---------------|

Q2: Shade T or F in the bubble sheet

(10 Marks)

41. Imperceptibility, security, capacity, and robustness are among the many aspects of image encryption design.
42. The cipher image converted into a non-readable form after encryption is called a plain image.
43. An effective image encryption algorithm should have the ability to reduce the correlations between adjacent pixels of plain image.
44. A neighborhood averaging filter in which all coefficients are equal is also referred to as a box filter.
45. The convolution mask for a 3×3 mean filter is given by matrix $[1/9 \ 1/9 \ 1/9; 1/9 \ 1/9 \ 1/9; 1/9 \ 1/9 \ 1/9]$.
46. Information entropy equal to 8, for a 512-gray level image.
47. The value of BER is between 0 and 1. The larger the value, the better the robustness of the algorithm.
48. A digital image is a visual representation of an object, a person, or a scene produced by an optical device such as a mirror, a lens, or a camera.
49. Raise contrast is an example of point processing.
50. The box filter replaces pixel with local average.

Best Wishes

Dr. Mohamed M. Darwish

Department of Mathematics		قسم الرياضيات
Faculty of Science		كلية العلوم
الامتحان النهائي للمستوى الثالث للفصل الدراسي الثاني 2023/ 2022م		
اسم المقرر: تحليل عددي (1) رمز المقرر: 323	الدرجة الكلية: 50 درجة	التاريخ: 2023 / 5 / 27 م الزمن: 3 ساعات

Answer the following questions:

1) Solve the following system

$$10x_1 + 3x_2 + 2x_3 = 15$$

$$x_1 + 10x_2 + 5x_3 = 16$$

$$x_1 + 6x_2 + 10x_3 = 17$$

By the method of iteration. Show that the process of iteration converges for the above system. What is the maximum error after applying 13 iterations ?

2) Derive the following numerical integration formula:

$$\int_{x_0}^{x_n} f(x) dx = \frac{h}{2} \left[f_0 + 2 \sum_{i=1}^{n-1} f_i + f_n \right] - \frac{n}{12} h^3 f''(\xi), \quad \xi \in (x_0, x_n)$$

Discuss the convergence of the above method taking:

$$f(x) = e^x \quad x_0 = 0 \quad \text{and} \quad x_n = x$$

3-a) Calculate by Simpson's formula:

$$\ln(2) = \int_1^2 \frac{1}{x} dx, \quad h = 0.1$$

b) Determin the value of n and h required to approximate

$$\int_0^1 \frac{1}{1+x^2} dx \quad \text{to within } 10^{-7} \text{ by Trapezoidal formula.}$$

من فضلك باقي الاسئلة في خلف الصفحة <<<

4- Consider the problem of finding the Fixed - Point of :

$$g(x) = \frac{1-x^2}{4.8} \text{ in } [0.0, 0.5]$$

- (i) Take $x_0 = 0.0$ and apply the fixed- point method to find x_1, x_2 and x_3
- (ii) How many iterations have to be carried out to find the root to within 10^{-9} ?
-

5-a) Construct the Lagrange interpolation polynomial for the function $y = \sin \pi x$

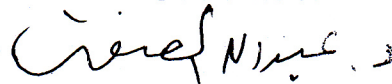
Choosing the points: $x_0 = 0, x_1 = \frac{1}{6}, x_2 = \frac{1}{2}$

b)) Given a table of the values of the function $y = f(x)$:

X	-1	0	1	2	3	4
f(x)	3	1	3	9	19	33

Compute the values $f(-0.5)$ and $f(3.5)$

Good Luck



Prof. A. El- SAFETY

Department of Math. Faculty of Science الزمن: ساعتان التاريخ: ٢٠٢٣/٦/١٦ م درجة الامتحان: (٥٠ درجة)	 الفرقة: المستوى الثالث المادة: الطرق الرياضية رقم المقرر: ٣٣٤	قسم الرياضيات كلية العلوم امتحان نهاية الفصل الدراسي الثاني ٢٠٢٣/٢٠٢٢ م
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أجب عن أربعة أسئلة فقط مما يأتي: (١٢.٥ درجة لكل سؤال)

(١-أ) برهن أنه إذا كانت $F(t)$ دالة دورية ولها دورة $T > 0$ فإن تحويل لابلاس لها هو

$$L\{F(t)\} = \frac{\int_0^T e^{-st} F(t) dt}{1 - e^{-sT}}$$

(ب) ارسم الدالة $F(t)$ المعرفة كالتالي: $F(t) = \begin{cases} \sin t, & 0 < t < \pi \\ 0, & \pi < t < 2\pi \end{cases}$ ثم أوجد تحويل لابلاس لها.

(ج) أوجد $L\{(t^2 - 3t + 2) \sin 3t\}$

(٢-أ) أثبت أنه إذا كان $L\{F(t)\} = f(s)$ فإن:

$$(i) L\{J_0(t)\} = \frac{1}{\sqrt{s^2 + 1}}, \quad (ii) L\{Si(t)\} = L\left\{\int_0^t \frac{\sin u}{u} du\right\} = \frac{1}{s} \tan^{-1} \frac{1}{s}$$

(ب) استخدم تحويلات لابلاس في حل المعادلة التفاضلية الجزئية الآتية: $\frac{\partial U}{\partial t} = \frac{\partial^2 U}{\partial x^2} - 4U$: $U(0, t) = 0$, $U(\pi, t) = 0$, $U(x, 0) = 6 \sin x - 4 \sin 2x$

(٣-أ) أثبت أنه إذا كان $L\{F(t)\} = f(s)$ فإن: $L\{t^n F(t)\} = (-1)^n \frac{d^n f(s)}{ds^n}$

(ب) أوجد كل مما يأتي:

$$(i) L\{\sin^2 3t\}, \quad (ii) L\{\operatorname{erf} \sqrt{t}\}, \quad (iii) \int_0^\infty t^3 e^{-t} \sin t dt$$

(٤-أ) استخدم تحويلات لابلاس لحل المعادلة التكاملية الآتية: $Y(t) = t^3 + \int_0^t Y(u) \sin(t-u) du$

(ب) أوجد كل مما يأتي:

$$(i) L^{-1}\left\{\frac{(s+1)e^{-\pi s}}{s^2 + s + 1}\right\}, \quad (ii) L^{-1}\left\{\frac{1}{(s^2 + 16)(s^2 + 9)}\right\}$$

$$Y''(t) - 3Y'(t) - 4Y(t) = 6e^t$$

(i) $L^{-1} \left\{ \frac{8s-6}{s^2-4s+29} \right\}$, (ii) $L\{(1+te^{-t})^3\}$

أ.د/ محمد عزب عبد الله & أ.د/ خلف محمود عبد الحكيم



"اسْتَعِينْ بِاللَّهِ وَلَا تَفْجُرْ"

الامتحان خمس (٥) صفحات - الإجابة في نفس الصفحة

Answer the following questions

Q1. Write in the space the expected output of the following sub code:

(10 Marks)

(a)

The output here

```
package examQ1;
public class ExamQ1
{
    public static void main(String[] arg)
    {
        drawline('*',5);
        System.out.print("\t Taqwa \t");
        drawline('*',5);
        System.out.print('\n');
    }
    static void drawline(char ch, int num)
    {
        for (int i = 1; i <= num; i++)
        {
            System.out.print(ch);
        }
    }
}
```

```
package q12023;
public class Q12023 {
    public static void main(String[] args) {
        B b1 = new B(10,"Assiut",2.3);
        b1.pnt1();
    }
}
class A
{
    int fat;
    String birt;
    public A(){}
    public A(int f, String bt){fat = f; birt = bt;}
    public void pnt(){System.out.printf("%s \t %d \t",birt,fat);}
}
class B extends A
{
    double son;
    public B(int f, String bt, double s){super(f, bt);son = s;}
    public void pnt1(){System.out.printf("%f \t",son); pnt();}
}
```

The output here:

Q2. Choose the wright output which appear when executing the following statements:

(10 Marks)

1. **`System.out.println(7/3);`**

- a) 2 b) 2.0 c) 0 d) 2.333

2. **`System.out.println(7/3 + 0.5);`**

- a) 2.5 b) 0.5 c) 2.8 d) 2

3. **`System.out.println((int)(7/3 + 0.5));`**

- a) 2 b) 0.5 c) 0 d) 2.5

4. **`System.out.println((double)7/2);`**

- a) 3.5 b) 0.5 c) 3.0 d) 3

5. **`System.out.println((double)(7/2));`**

- a) 3.0 b) 0.5 c) 3.5 d) 3

6.

```
double num[] = {2.9, 3.1, 3.0}; double result = 0;
for (int i = 0; i < 3; ++i)
    result = result + num[i];
System.out.println(result/3);
```

- a) 3 b) 0.0 c) 0 d) 3.0

7.

```
int a = 3; System.out.println(++a * 8);
```

- a) 23 b) 25 c) 24 d) 32

8.

```
double B = 2.5; System.out.println(++B);
```

- a) 3 b) 2.5 c) 4 d) 3.5

9.

```
double B = 2.5; System.out.println((int)++B);
```

- a) 3.5 b) 2.5 c) 4 d) 3

Q3: Write the class named ***fraction***, this class must contain the following:

- two fields named ***num*** (البسط) and ***dem*** (المقام) with ***integer*** type.
- constructor with two arguments to initialize the fields.
- the function named ***sum()*** with two arguments from the ***fraction*** type, and return the sum of two objects from the class ***fraction***, the return type of this function in floating point format

$$\text{sum}(f_1, f_2) = \frac{a_1}{b_1} + \frac{a_2}{b_2} = \frac{a_1 b_2 + a_2 b_1}{b_1 b_2} \text{ if } f_1(a_1, b_1), f_2(a_2, b_2)$$

- in the ***Main*** function, create the two objects ***f1*** and ***f2*** with initial values and call the function ***sum*** by class name to compute the sum of the two fractions. (10 Marks)

The program here:

Q4. Suppose a is a double variable, choose the correct answers: (20 Marks)

1. the conditional statement

$\text{boolean action} = a > 0 ? a > 10 ? \text{false} : \text{true} : \text{false};$

assigns to action

- (a) **false** value if a is negative or a greater than 10 (b) **false** value if a is positive less than 10
(c) **true** value if a is equal 11 (d) All the mentioned

2. the conditional statement

$\text{boolean action} = a > 0 ? a < 10 ? \text{false} : \text{true} : \text{true};$

assigns to action

- (a) true value if a is equal 10 (b) **true** value for all values of a
(c) **false** value for all values of a (d) None of the mentioned

3. the conditional statement

$\text{boolean action} = a < 0 ? a > 10 ? \text{true} : \text{false} : \text{false};$

assigns to action

- (a) **false** value if a is only negative (b) **false** value if a is only positive less than or equal 10
(c) **true** value if a is only positive greater than 10 (d) None of the mentioned

4. the conditional statement

$\text{boolean action} = a > 0 ? a < 10 ? \text{false} : \text{true} : \text{false};$

assigns to action

- (a) **false** value if a is negative (b) **false** value if a is positive less than 10
(c) **true** value if a is equal 10 (d) All the mentioned

5. the conditional statement

$\text{boolean action} = a > 0 ? a < 10 ? \text{true} : \text{false} : \text{false};$

assigns to action

- (a) **false** value if a is equal to zero (b) **false** value if a is positive greater than 10
(c) **true** value if $a \in (0, 10)$ (d) All the mentioned

6. the conditional statement

boolean action = a < 0 ? a > 10 ? true : false : false;

assigns to action

- (a) **false** value if **a** is only positive less than or equal 10 (b) false value for any a
(c) **true** value if **a** is only positive greater than 10 (d) None of the mentioned

7. the conditional statement

boolean action = a > 0 ? a > 10 ? true : false : true;

assigns to action

- (a) **false** value if **a** is any positive (b) false value if a is only positive less than or equal 10
(c) **true** value if **a** is only positive less than 10 (d) None of the mentioned

8. the conditional statement

boolean action = a < 0 ? a > 10 ? false : false : true;

assigns to action

- (a) **false** value if **a** is only equal zero (b) true value if a is any positive
(c) **true** value if **a** is only positive greater than 10 (d) None of the mentioned

9. the conditional statement

boolean action = a < 10 ? a > 0 ? true : false : false;

assigns to action

- (a) **false** value if **a** is negative (b) **false** value if **a** is positive greater than or equal 10
(c) **true** value if **a** is only positive less than 10 (d) All of the mentioned

10. the conditional statement

boolean action = a > 10 ? a > 0 ? true : false : false;

assigns to action

- (a) **false** value if **a** is negative (b) **false** value if **a** is positive less than or equal 10
(c) **true** value if **a** is positive greater than 10 (d) All of the mentioned

***End of Exam, with my best wishes:
Dr- Abdel-Rahiem Ahmed Hashem Mohammed***

د. عبدالرحيم احمد هاشم محمد

A- Choose the correct answer:

- 1- In what of the following situations sampling plays an important role:
 - a. In identifying, developing, and understanding new marketing concepts that need To be investigated
 - b. In designing questionnaires
 - c. In reducing the time and money it will take to conduct a survey
 - d. In developing scale measurements used to collect primary data
 - e. All of the above

- 2- The studies which cover all the members of _____ are called 'census'.
 - a. Elements
 - b. Population
 - c. Sample
 - d. Sampling frame
 - e. All of the above

- 3- A _____ is a representation of the elements of the target population.
 - a. Population
 - b. Sampling frame
 - c. Sample
 - d. Element
 - e. All of the above

- 4- Which of the following is a not a probability sampling technique
 - a. Systematic random sampling
 - b. Cluster sampling
 - c. Quota sampling
 - d. Stratified sampling

- 5- In which sampling technique a random number table is employed.
 - a. Snowball sampling
 - b. Simple random sampling
 - c. Systematic random sampling
 - d. Convenience sampling

- 6- In which technique selection of sample is left entirely to the researcher.
- Convenience sampling
 - Simple random sampling
 - Stratified sampling
 - Cluster sampling
- 7- Which nonprobability sampling technique is called as the most refined nonprobability Technique?
- Convenience sampling
 - Simple random sampling
 - Judgement sampling
 - Quota sampling
 - Snowball sampling
- 8- Which among the following is not a noncomparative scaling technique?
- Likert
 - Stapel
 - Semantic differential
 - Rank order
 - None of the above
- 9- The idea of assigning numbers can be helpful in:
- Allowing statistical testing
 - Facilitating easier communication
 - Both a and b
 - None
- 10- Which of the following scale has assignment property?
- Nominal
 - Ordinal
 - Interval
 - Ratio
 - All of the above
 - None of the above

- 11- The interval scale possesses all of the below properties, except:
- Assignment
 - Order
 - Distance
 - Origin
 - All of the above
 - None of the above
- 12- Which among the following is not comparative scaling technique?
- Paired comparison
 - Rank order
 - Constant sum scale
 - Q-sort
 - Stapel scale
- 13- In which of the following interviewing methods most complex question scales can be Used easily?
- Personal interviews
 - Telephone interviews
 - Mail interviews
 - Online interviews
- 14- Unstructured questions are also called as:
- Close ended
 - Open ended
 - Both
 - None
- 15- Open ended questions are mostly used in:
- Exploratory research
 - Conclusive research
 - Both
 - None
- 16- What should be avoided when developing a questionnaire?
- Complex words
 - Ambiguous words
 - Leading questions
 - Generalizations
 - All of the above

- 17- Most socioeconomic and demographic questions are defined as:
- Identification information
 - Specific information
 - Classification information
 - All of the above
- 18- When the research objective of a study is to gain background information and to clarify The research problems to create hypotheses, it is generally referred to as:
- Exploratory research design
 - Descriptive research design
 - Causal research design
 - Experimental research design
 - All of the above
- 19- Which of the following is TRUE?
- Secondary data are more accurate than primary data.
 - The researcher should attempt to gather secondary data before initiating a search for primary data.
 - Primary data are gathered by the researcher and secondary data by other Researchers.
 - If a researcher obtains secondary data from the party who collected them, he or She is using a secondary source of secondary data.
 - They are all false.
- 20- A quantitative research study aims to achieve all of the following, EXCEPT:
- Test various types of hypotheses
 - Make accurate predictions about relationships between market factors and Behaviors
 - Generate sustainable competitive advantages for an organization
 - Gain meaningful insights into the relationships between variables
 - Validate the existing relationships between variables

- 21- Qualitative research techniques perform better for which of the following issue in Comparison to quantitative research techniques?
- A) Developing generalizable findings
 - B) Gathering rich data
 - C) Distinguishing small differences
 - D) High reliability
 - E) High validity
- 22- The optimal number of participants for a focus group is:
- A) 1-2 members
 - B) 3-7 members
 - C) 8-12 members
 - D) 12-20 members
 - e) 20-50 members
- 23- We use sampling many times during our daily lives.
- a. True
 - b. False
- 24- Non-sampling errors represent any type of bias that is attributable to mistakes in either Drawing a sample or demining the sample size.
- a. True
 - b. False
- 25- Most people use measurement in their daily lives.
- a. True
 - b. False
- 26- The appropriateness of the raw data being collected depends directly on the scaling Technique used by the researcher.
- a. True
 - b. False
- 27- The origin property refers to a numbering system where zero is the displayed or Referenced starting point in the set of possible responses.
- a. True
 - b. False

- 28- Respondent characteristics such as intelligence, education does not have any affect the Test score.
- a. True
 - b. False
- 29- Validity refers to scale consistency over a period of time.
- a. True
 - b. False
- 30- A questionnaire is a formalized set of questions involving one or more measurement Scales designed to collect specified secondary data.
- a. True
 - b. False
- 31- The first step in developing a questionnaire is to specify the information needed in Researchable format.
- a. True
 - b. False
- 32- Double barrelled questions should be avoided in questionnaire development .
- a. True
 - b. False
- 33- The forward and opening questions are highly important in gaining respondents' trust and Making them feel comfortable with the study.
- a. True
 - b. False
- 34- A questionnaire should not be used in the field survey without being adequately pilot Tested.
- a. True
 - b. False
- 35- Marketing research is the only element which can assist in the overall process.
- a. True
 - b. False

 قسم الرياضيات كلية العلوم	المقرر: بحوث عمليات (326) الفرقة: المستوى الثالث الدرجة: 50 درجة نظري التاريخ: السبت 2023/5/27 الزمن: 3 ساعات	جامعة أسيوط كلية العلوم - قسم الرياضيات امتحان نهائي الفصل الدراسي الثاني للعام الجامعي 2022-2023
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Multiple Choice Questions: (one mark for every question)

*** The petrochemicals compare produces three products are x_1, x_2, x_3 There are three stages the production process in three stages as shown in the table. answer equation (form 1 to 11)

stages	x_1	x_2	x_3	Time of minutes
Stage 1	3	1	5	3
Stage 2	2	5	4	4
Stage 3	4	1	6	2
Z	80	70	90	

1) objective function is

a) $Z=3x_1+4x_2+2x_3$

b) $Z=80x_1+70x_2+90x_3$

c) $Z=3x_1+x_2+5x_3$

2) The first constraint is

a) $4x_1+x_2+6x_3 \leq 2$

b) $2x_1+5x_2+4x_3 \leq 4$

c) $3x_1+x_2+5x_3 \leq 3$

3) The second constraint is

a) $4x_1+x_2+6x_3 \leq 2$

b) $2x_1+5x_2+4x_3 \leq 4$

c) $3x_1+x_2+5x_3 \leq 3$

4) The third constraint is

a) $4x_1+x_2+6x_3 \leq 2$

b) $2x_1+5x_2+4x_3 \leq 4$

c) $3x_1+x_2+5x_3 \leq 3$

5) Value of x_1 in first constraint is

a) $3/5$

b) 3

c) 1

6) Value of x_2 in first constraint is

a) $3/5$

b) 3

c) 1

7) Value of x_3 in first constraint is

a) $3/5$

b) 3

c) 1

8) Value of x_2 in second constraint is

a) 2

b) $4/5$

c) 1

9) Value of x_3 in second constraint is

a) 2

b) $4/5$

c) 1

10) Value of x_1 in third constraint is

a) $1/2$

b) 2

c) $1/3$

11) Value of x_2 in third constraint is

a) $1/2$

b) 2

c) $1/3$

*** To find the optimal solution of Model of linear programming the next by the Graphical Method .
answer equation (12-20)

Max $Z = 5x_1 + 4x_2$

S.t $4x_1 + x_2 \leq 40, \quad 2x_1 + 3x_2 \leq 90, \quad x_1, x_2 \geq 0$

28) pivot equation is

- a) $(4/3, 0, -1/3, 0, 1, 4)$ b) $(-4/3, 0, 7/3, 0, 28)$ c) $(2/3, 1, 1/3, 0, 4)$

29) pivot element is

- a) intersection second row and second column b) intersection second row and first column
c) intersection first row and second column

30) The New row Z is

- a) $(4/3, 0, -1/3, 0, 1, 4)$ b) $(-4/3, 0, 7/3, 0, 28)$ c) $(2/3, 1, 1/3, 0, 4)$

31) The New row S_2 is

- a) $(4/3, 0, -1/3, 0, 1, 4)$ b) $(-4/3, 0, 7/3, 0, 28)$ c) $(2/3, 1, 1/3, 0, 4)$

32) pivot equation (form table 2) is

- a) $(1, 0, -1/4, 0, 3/4, 3)$ b) $(0, 1, 1/2, 1/2, 2)$ c) $(0, 0, 2, -1, 32)$

33) pivot element (in table 2) is

- a) intersection second row and second column b) intersection second row and first column
c) intersection first row and second column

34) The New row Z (form table 2) is

- a) $(1, 0, -1/4, 0, 3/4, 3)$ b) $(0, 1, 1/2, -1/2, 2)$ c) $(0, 0, 2, 1, 32)$

35) The New row X_2 (form table 2) is

- a) $(1, 0, -1/4, 0, 3/4, 3)$ b) $(0, 1, 1/2, -1/2, 2)$ c) $(0, 0, 2, 1, 32)$

36) The solution at point

- a) $(12, 8)$ b) $(3, 2)$ c) $(4, 4)$

37) Max Z equal

- a) 32 b) 23 c) 28

*** writ dual of following liner problem

$$\text{Max } z = 3x_1 + 2x_2 + 3x_3$$

$$\text{S.t } 2x_1 + x_2 + x_3 \leq 2, \quad 3x_1 + 4x_2 + 2x_3 \geq 8, \quad x_1, x_2, x_3 \geq 0$$

For the dual problem answer equation (38-42)

38) objective faction of dual is

- a) $\text{Min } w = 2y_1 + 8y_2$ b) $\text{Max } w = 2y_1 - 8y_2$ c) $\text{Min } w = 2y_1 - 8y_2$

39) The first constraint of dual is

- a) $2y_1 - 3y_2 \geq 3$ b) $y_1 - 4y_2 \geq 2$ c) $y_1 - 2y_2 \geq 3$

40) The second constraint of dual is

- a) $2y_1 - 3y_2 \geq 3$ b) $y_1 - 4y_2 \geq 2$ c) $y_1 - 2y_2 \geq 3$

41) The third constraint of dual is

- a) $2y_1 - 3y_2 \geq 3$ b) $y_1 - 4y_2 \geq 2$ c) $2y_1 + 3y_2 \geq 3$

42) Non- Negatively of dual is

- a) y_1 unrestricted, $y_2 \geq 0$ b) $y_1, y_2 \leq 0$ c) $y_1, y_2 \geq 0$

*** If the solution of this model by Simplex method this problem

$$\text{Max } Z = 5x_1 + 3x_2$$

$$\text{S.t } x_1 - x_2 \leq 2$$

$$2x_1 + x_2 \leq 4, \quad -3x_1 + 2x_2 \leq 6$$

$$x_1, x_2 \geq 0 \text{ Is}$$

Basic variable	x_1	x_2	S_1	S_2	S_3	solution
S_1	0	0	1	$1/7$	$3/7$	$36/7$
x_1	1	0	0	$2/7$	$-1/7$	$2/7$
x_2	0	1	0	$3/7$	$2/7$	$24/7$
Z	0	0	0	$19/7$	$1/7$	$82/7$

Discuss sensitivity Analysis answer equation (43-50)

43) unequally for the second variable x_1 is

$$\text{a) } \frac{19}{7} + c_1 \times \frac{2}{7} \geq 0, \quad \frac{1}{7} - c_1 \times 1/7 \geq 0 \quad \text{b) } \frac{19}{7} - c_1 \times \frac{3}{7} \geq 0, \quad \frac{1}{7} - c_1 \times 2/7 \geq 0$$

$$\text{c) } 19/7 + c_1 \times 3/7 \geq 0, \quad 1/7 + c_1 \times 2/7 \geq 0$$

44) unequally for the third variable x_3 is

$$\text{a) } \frac{19}{7} + c_2 \times \frac{2}{7} \geq 0, \quad \frac{1}{7} - c_2 \times 1/7 \geq 0 \quad \text{b) } 19/7 + c_2 \times 3/7 \geq 0, \quad 1/7 + c_2 \times 2/7 \geq 0$$

$$\text{c) } \frac{19}{7} - c_2 \times \frac{3}{7} \geq 0, \quad \frac{1}{7} - c_2 \times 2/7 \geq 0$$

45) The value of c_1 is between

$$\text{a) } -19/2 \leq c_1 \leq 1$$

$$\text{b) } -19/3 \leq c_1 \leq -1/2$$

$$\text{c) } -8 \leq c_1 \leq -1$$

46) The value of c_2 is between

$$\text{a) } -19/2 \leq c_2 \leq 1$$

$$\text{b) } -19/3 \leq c_2 \leq -1/2$$

$$\text{c) } -8 \leq c_2 \leq -1$$

47) The value of a_1 is between

$$\text{a) } -19/2 \leq a_1 \leq 1$$

$$\text{b) } -19/3 \leq a_1 \leq -1/2$$

$$\text{c) } -8 \leq a_1 \leq -1$$

48) The value of a_2 is between

$$\text{a) } -19/2 \leq a_2 \leq 1$$

$$\text{b) } -19/3 \leq a_2 \leq -1/2$$

$$\text{c) } -12 \leq a_2 \leq 1$$

49) The value of x_2 is between

$$\text{a) } -9/2 \leq x_1 \leq 6$$

$$\text{b) } -10/3 \leq x_1 \leq 5/2$$

$$\text{c) } -8 \leq x_1 \leq -1$$

50) The value of x_3 is between

$$\text{a) } -9/2 \leq x_2 \leq 6$$

$$\text{b) } -10/3 \leq x_2 \leq 5/2$$

$$\text{c) } -12 \leq x_2 \leq 1$$

بالتوفيق والنجاح

د / مصطفى الخطيب

Question 1: Answer the following (MCQ) questions: (30 Marks)

1-time for a small packet to travel from a client to server and come back.

- A)RTT B)HTTP C)URL

2-process in different hosts communicate by

- A)exchanging messages B)inter-process communication C)URL

3-data over DSL phone line goes to

- A)Internet B)telephone net C)none of the previous

4-if $L=7.5$ Mbits, $R=1.5$ Mbps then one-hop transmission delay Sec

- A)1.5 B)11.25 C)5

5- moves packets from router input to appropriate router output.

- A)routing B)forwarding C)switching

6-socket messages.

- A)send b)receive C)send and receive

7-send packet with false source address.

- A)type wrong address by mistake B)IP spoofing C)all of the previous

8- which of the following terms is not associated with the DSL?

- A)DSLAM B)splitter C)CMTS

9-Which of the following is an architecture paradigm?

- A)P2P B)client-server C)all of the previous

10- which of the following is false with respect to TCP?

- A)connection-oriented B)transport layer protocol C)unreliable

11-application layer protocol defines

- A)types of messages exchanged
B)rules for when and how processes send and respond to messages
C)all of the above

12- when displaying a web page, the application layer uses the

- A)HTTP B)FTP C)SMTP

13-All communication activities in internet is governed by

- A)router B) protocol C) network

14-P2P applications face the challenge

- A) *ISP Friendly* B)*Security* C)*All of the previous*

15- End systems access the Internet through _____

- A) Internet Service Providers (ISPs)
B) Customer premises Equipment (CBE)
C) Digital subscriber line (DSL)

16-The only control that the application developer has on the transport-layer side is

- A) the choice of transport protocol
- B) the choice of link protocol
- C) the choice of network protocol

17- ----- can make use of as much, or as little, throughput as happens to be available.

- A) bandwidth-sensitive applications
- B) elastic applications
- C) critical applications

18- When this client-server interaction is taking place over TCP, the application developer needs to make an important decision—should each request/response pair be sent over a *separate* TCP connection, or should all of the requests and their corresponding responses be sent over the *same* TCP connection? In the former approach, the application is said to use ---

- A) non-persistent connections
- B) persistent connections
- C) critical connections

19- The RTT includes

- A) packet-propagation delays
- B) packet-queuing delays
- C) all of the previous

20. The number of layers in ISO / OSI reference model is _____

- A) 10
- B) 7
- C) 6

21. Which is not an application layer protocol?

- A) HTTP
- B) SMTP
- C) TCP

22. e-mail uses which protocol?

- A) SMTP
- B) HTTP
- C) FTP

23. malware can record keystrokes, web sites visited, upload info to collection site.

- A) virus
- B) worm
- C) spyware

24. Which protocol is a protocol of application layer?

- A) HTTP
- B) TCP
- C) IP

25. What is client process?

- A) Process that initiates communication.
- B) Process that waits to be contacted.
- C) protocol in the application layer.

26. What is the HTTP port number?

- A) 25
- B) 110
- C) 80

27. voice over DSL phone line goes to.....

- A) internet
- B) telephone net
- C) cable net

28.....are the 2 key network core functions

- A) routing& switching
- B) routing&forwarding
- C) none of the previous

29- check bit errors.

- A) nodal processing
- B) queueing delay
- C) transmission delay

30- determine output link.

- A) nodal processing
- B) queueing delay
- C) transmission delay

Question 2: Select which of the following statements are false and which are true? (20 Marks)

31-In a client-server architecture, there is an always-on host, called the server

A) True B) False

32-with the client-server architecture, clients directly communicate with each other

A) True B) False

33-in the client-server architecture is that the server has a fixed, well-known address, called an IP address

A) True B) False

34-a client can always contact the server by sending a packet to the server's IP address

A) True B) False

35-a popular social-networking site can quickly become overwhelmed if it has only one server handling all of its requests

A) True B) False

36-A data center can have hundreds of thousands of servers, which must be powered and maintained

A) True B) False

37-the service providers do not pay recurring interconnection and bandwidth costs for sending data from their data centers.

A) True B) False

38-In a P2P architecture, the peers are owned by the service provider.

A) True B) False

39-One of the most compelling features of P2P architectures is their self-scalability.

A) True B) False

40-A process can be thought of as a program that is running within an end system.

A) True B) False

41-a process in a P2P file-sharing system can not both upload and download files.

A) True B) False

42-In the context of a communication session between a pair of processes, the process that initiates the communication is labeled as the server. The process that waits to be contacted to begin the session is the client.

A) True B) False

43-A process sends messages into, and receives messages from, the network through a software interface called a socket.

A) True B) False

44-the interface between the application layer and the transport layer within a host is also referred to as the Application Programming Interface (API) between the application and the network

A) True B) False

45-The application developer has control of everything on the application-layer side of the socket and has control of everything of the transport-layer side of the socket.

A) True B) False

46- Popular applications have not been assigned specific port numbers.

A) True B) False

47- something has to be done to guarantee that the data sent by one end of the application is delivered correctly and completely to the other end of the application. If a protocol provides such a guaranteed data delivery service, it is said to provide reliable data transfer.

A) True B) False

48- When a transport-layer protocol doesn't provide reliable data transfer, this is not acceptable for loss-tolerant applications,

A) True B) False

49- in UDP there is handshaking before the two processes start to communicate.

A) True B) False

50-UDP provides a reliable data transfer service.

A) True B) False

Good Luck

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Faculty of Science		كلية العلوم
امتحان نهائي الفصل الدراسي الثاني 2023/2022 م		
الفرقة : المستوى الثالث علوم	الزمن : ساعتان	درجة الامتحان : 50 درجة
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ملاحظة: يتم طمس (تسويد) الإجابة المختارة باستخدام القلم الجاف فقط في ورقة البابل شيت

Answer all the following questions:

1- What is the advantage of using SPSS over calculating statistics by hand?

- A) This is how most quantitative data analysis is done in "real research" nowadays
 B) It reduces the chance of making errors in your calculations
 C) It equips you with a useful transferable skill
 D) All of the above.

2- Descriptive and frequencies command used in.

- A) Tables
 B) charts
 C) windows
 D) SPSS

3- In SPSS, the window where the results of your analysis appear?

- A) Data view
 B) Data editor
 C) Output viewer
 D) Variable view

4-What are the two main windows in SPSS?

- A) Variable view and Output viewer
 B) Data editor and Output viewer
 C) Data view and Variable view
 D) Data view and Output view

5-Which menu would you select to run descriptive statistical in SPSS?

- A) Analyze menu
 B) Graph menu
 C) Data menu
 D) Transform menu

6-In SPSS, rows represent variables and columns represent characteristics of variables in

- A) Output Viewer
 B) Variable view
 C) Data editor
 D) Data view

7- IN EXCEL, are numbered from 1 to onwards and are numbered from A to onwards.

- A) Columns, Rows
 B) rows , columns
 C) slides, rows
 D) slides, columns

8- Excel is a program that is used to prepare a.....

- A) Slide presentation.
 B) Spreadsheet
 C) Text document
 D) Pictures

9- You can enter which types of data into worksheet cells?

- A) Labels, values, and formulas
 B) Labels and values but not formulas
 C) Values and formulas but not labels
 D) Just values

10- Valid Range Arguments for a SUM function

- A) Range along a column
 B) Non-contiguous cells
 C) Both of them
 D) None of them

11- Which function in Excel checks whether a condition is true or not ?

- A) SUM
 B) COUNT
 C) IF
 D) AVERAGE

12- Which of the following is not a term of MS-Excel?

- A) Cells
 B) Rows
 C) Document
 D) Columns

13- To change precision of B2 which contain 336.85 to 336.9, we use

- A) =SUM(B2:B3)
 B) =ROUND(B2;1)
 C) =ROUND(B2;0)
 D) =SUM(A1:B2)

14- Which is Mixed Cell Referencing?

- A) D\$2
 B) \$D\$2
 C) \$D:2
 D) \$D2\$

15- In SPSS, Data can be entered in the _____ spreadsheet.

- A) Variable view
 B) data view
 C) Both A & B
 D) none of these

See behind page,,,,,,,,,,,,,,,,,,,,,

- 16- In SPSS, Most output display in tables can be modified by ____ clicking on the table.**
 A) Single B) double C) triple D) none of these
- 17- You can auto fit the width of column by**
 A) Double clicking on the column name on column header
 B) Double click on the cell pointer in worksheet
 C) Double clicking on column right border on column header
 D) Double clicking on the column left border of column header
- 18- In SPSS, Which command provides an advanced facility for table editing.**
 A) Pivot table editor B) table editor C) A & B D) none of these
- 19- How many type of spreadsheet in SPSS.**
 A) Two. B) Three. C) four. D) five.
- 20- In SPSS, The variables name must begin with a.**
 A) number B) space C) Ampersands(&) D) letter
- 21- In excel, which menu would you select to run descriptive statistical**
 A) View menu B) Page layout menu C) Data menu D) Insert menu
- 22- The Greater Than sign (>) is an example of _____ operator.**
 A) Arithmetic B) Logical C) Conditional D) None of them
- 23- What happens when dollar signs (\$) are entered in a cell address (\$B\$2)**
 A) An absolute cell address is created B) The sheet tab is changed
 C) Cell address will change when it is copied to another cell
 D) The cell color will change
- 24- What does COUNTA() function do**
 A) Counts cells having alphabets B) Counts empty cells
 C) Counts non-empty cells D) Count all cells
- 25- Which menu item contains procedures to compute variables in SPSS?**
 A) Analyze menu B) Data menu C) Graph menu D) Transform menu
- 26- Which of the following formulas will Excel Not be able to calculate?**
 A) =SUM(A1:A5)*.5 B) =SUM(A1:A5)/(10+10) C) SUM(A1:A5)-10 D) =A1+1
- 27- Zero round value to**
 A) Specified number of decimal places B) tens, hundred, etc C) a whole number
- 28- If we stand in cell B4 and we want to go to D8, then we move**
 A) Col shift=1; row shift=0 B) Col shift=2; row shift=4
 C) Col shift=4; row shift=2 D) Col shift=3; row shift=1
- 29- Excel Error Value that Numeric value too wide to display is**
 A) #REF! B) #VALUE! C) ##### D) #DIV/0
- 30- What is the intersection of a column and a row on a worksheet called?**
 A) Column B) Value C) Cell D) Row
- 31-..... use to change fonts, justify text, insert rows, etc.**
 A) File menu B) home ribbon C) quick access toolbar D) View menu
- 32- Which function in Excel tells how many numeric entries are there?**
 A) NUM B) COUNT C) SUM D) IF
- 33- What will be the result if you type =A1=B1 in cell C1?**
 A) Yes or No B) True or False C) Value of A1 D) Value of B1

See behind page,,,,,,,,,,,,,

- 34- In the Data View in the SPSS, each column represents what?**
 A) A case. B) A data point. C) A missing value. D) A variable.
- 35- The "SPSS" is a package of programs for.**
 A) Analyzing B) manipulation C) presenting data D) all of these
- 36- Which of the following is used for creating and defining various characteristics of variables in SPSS?**
 A) Variable viewer B) Output viewer C) Data editor D) Data view
- 37- In SPSS, Value labels are most likely to be necessary for which type(s) of variables.**
 A) Nominal variables. B) Ordinal variables. C) All types D) Scale variables.
- 38- SPSS base provides method for.**
 A) Data description B) Linear regression C) Simple inference D) all of these
- 39- SPSS stands for.**
 A) Statistical package for the social sciences.
 B) Standard package for the social sciences
 C) A & B D) none of these
- 40- In SPSS, Ampersands (&) and spaces _____ used as variables name.**
 A) Can be B) cannot be C) none of these D) Both A & B
- 41- Which area in an Excel window allows entering values and formulas?**
 A) Standard Tool Bar B) Menu Bar C) Formula Bar D) Title Bar
- 42- Data view and variable view are type of.**
 A) windows B) software C) spreadsheet D) none of these
- 43- How is a variable name different from a variable label in SPSS?**
 A) It is shorter and less detailed B) It is longer and more detailed
 C) It is abstract and unspecific D) It refers to codes rather than variables
- 44- Spreadsheets in Excel are referred to as**
 A) Workbooks B) work faces C) worksheets D) work slides
- 45- Which formula is true**
 A) =COUNTIF(C5:C8;D5:D8;">6") B) =COUNTIF(C5:D8;">6")
 C) =COUNTIF(C5:D8; >6) D) All of them
- 46- The SUMIF Function is in the form**
 A) =SUMIF(range; criteria; sum-range) B) =SUMIF(sum-range; criteria; range)
 C) =SUMIF(range; criteria) D) All of them
- 47- Which command is used for sorting in SPSS.**
 A) Toolbar B) sort case C) Both A & B D) all of these
- 48- In SPSS, what is the "Data Viewer"?**
 A) A table summarizing the frequencies of data for one variable
 B) A spreadsheet into which data can be entered
 C) A dialog box that allows you to choose a statistical test
 D) A screen in which variables can be defined and labeled
- 49- The ROUND function used to**
 A) Calculate the sum of values B) change the precision of value C) none of them
- 50- Except for the function, a formula with a logical function shows the word "TRUE" or "FALSE" as a result**
 A) IF B) AND C) OR D) NOT

Introduction to Scientific Computations (356MC)

Time: 2 hour**Marks: 50**

Answer the following questions

Question No.1 :

(30 marks)

Choose the best single correct answer

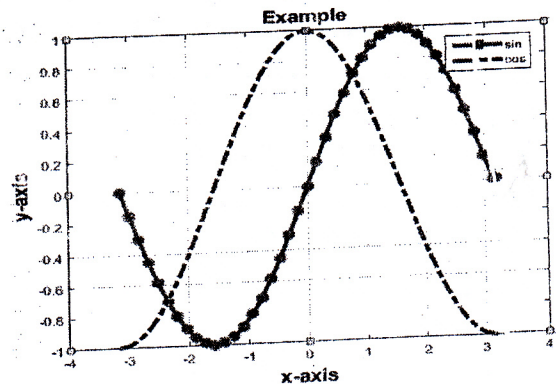
(One mark for each question)

1. What does MATLAB stands for?
a) Matrix Library
b) Matrix Laboratory
c) Math Laboratory
d) Mathworks
2. What is the default extension for MATLAB files?
a) .mat
b) .txt
c) .m
d) .script
3. To add comments in MATLAB, use _____
a) %
b) //
c) /%
d) %/
4. _____ shows all the variables created and/or imported from files.
a) Command window
b) Workspace
c) Command history
d) Current folder
5. Which of the following commands creates the array of equidistant points 0, 0.2, 0.4, 0.6, 0.8, 1?
a) `x=linspace(0,1,6)`
b) `x=0:0.2:1`
c) `x=linspace(0,6,1)`
d) both a and b
6. Which command is used to display a message on the command window?
a) `fprint`
b) `vardisp`
c) `disp`
d) `dispmsg`
7. _____ is used to check if two elements are equal in MATLAB.
a) `==`
b) `!=`
c) `=`
d) `isequal`
8. The output of the following MATLAB statement
`>> y='4+5'`
a) 9
b) 4+5
c) 45
d) Error
9. If the result of our summation is Infinity, what will MATLAB show?
a) Infinity
b) Nan
c) Inf
d) Error

10. Which command in MATLAB is used to create a matrix with ones on the diagonal and zeros elsewhere?
 a) ones b) zero c) det d) eye
11. What is the output of y in the following statements
`x=4;`
`x/2;`
`y=ans*5`
 a) 5 b) 10 c) 20 d) ???Undefined function or variable 'ans'
12. The for end loop will repeat a segment of program
 a) based on a vector counter. b) while a conditional statement is true.
 c) every time the enter key is pressed. d) indefinitely.
13. The output of the last line of the following MATLAB code is
`x=[1 2 3 4]; y=[5 6];`
`z=[x; y]`
 a) `z=[1 2 3 4 5 6]` b) `z=[1 2; 3 4; 5 6]` c) `z=[1 2 3 4; 5 6]` d) Error
14. Which MATLAB command is used to find a root of the equation
 $f(x)=x-\cos x$, in the interval $[0,1]$?
 a) `f = @(x) x-cos(x); fzero(f, [0,1])`
 b) `f = x-cos x; solve(f, [0,1])`
 c) `f = @(x) x-cos(x); roots(f)`
 d) `f = x-cos(x); fzero (f, [0,1])`
15. The output for `syms x y; diff(y^2,x)` is
 a) $2 \, dy/dx$ b) $2*y$ c) 0 d) Error
16. To calculate the second derivative $\frac{\partial^2 f}{\partial x \partial y}$ of the function
 $f(x, y, z) = x^3 y^2 z$, we use the MATLAB code
 a) `syms x y z; diff2(diff(x^3*y^2*z, y),x)`
 b) `syms x y z; diff(diff(x^3*y^2*z, y),x)`
 c) `syms x y z; diff2(x^3*y^2*z, y, x)`
 d) `sym x y z; diff(x^3 y^2 z, y, x, 2)`
17. To calculate the integration $\int_0^\infty e^{-x^2} dx$, we use the MATLAB code
 a) `syms x; int('exp(-x^2)', x, 0, inf)`
 b) `syms x; int(exp(-x^2), x, 0, inf)`
 c) `syms x; integrate(e^(-x^2), x, 0, inf)`
 d) `syms x; integrate(exp(-x^2), x, 0, inf)`

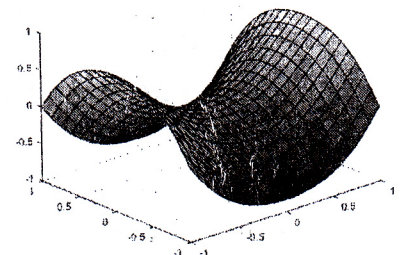
★ The following MATLAB code is used for drawing the figure on the right.
Answer the following five questions from 18-22:

```
>> x=-pi:pi/20:pi;
>> f1=sin(x);
>> f2=cos(x);
>> plot(x, f1, '-ro', x, f2, '-.b')
>> .....①..... ('sin', 'cos', 2)
>> .....②..... ('Example')
>> grid on
```



18. What is the purpose of the plot command in the given code?
 - a) Generate a scatter plot
 - b) Create a bar graph
 - c) Plot a line graph
 - d) Display a 3D surface plot
19. Which command is used to label the y-axis in the figure?
 - a) ytitle
 - b) y-axis
 - c) xlabel
 - d) ylabel
20. Which command is used in place number ① to describe labels for each plotted data?
 - a) hold on
 - b) grid on
 - c) legend
 - d) label
21. In the place number ②, which command is used to set the title of the figure?
 - a) legend
 - b) title
 - c) label
 - d) addtitle
22. What is the function of the grid on command in the code?
 - a) Enable gridlines in the figure
 - b) Set the grid color to white
 - c) Display a grid of dots on the plot
 - d) Adjust the grid spacing based on the data
23. To draw the figure on the right which equation giving by $z = \sin(x^2 + y^2)$ and $(x,y) \in [-1,1] \times [-1,1]$ in MATLAB language, we use the code

- a) `[x,y]=meshgrid(-1:1:1); z=sin(x.^2-y.^2); plot3(x,y,z)`
- b) `[x,y]=meshgrid(-1:1:1); z=sin(x.^2-y.^2); surf(x,y,z)`
- c) `[x,y]=meshgrid(-1:1:1); z=sin(x.^2-y.^2); mesh(x,y,z)`
- d) `z=sin(x.^2-y.^2); surf(x,y,z)`



- * The following MATLAB code uses the Newton-Raphson method to find a root of the equation $x^3 - 2x^2 + x - 3 = 0$ with the initial point 4 and tolerance (tol)=0.001. Answer the following four questions from 24-27.

```

function x2=newton(x1,tol)
f=@(x) x^3-2*x^2+x-3;
fd=.....①.....;
x2=x1-(f(x1)/fd(x1));
while .....②.....
    x1=x2;
    .....③.....;
end

```

24. Which of the following expressions is valid in place number ①
- `@(x) 3*x^2-4*x+1`
 - `inline('3*x^2-4*x+1')`
 - `@(x) (6*x-4)`
 - both a and b
25. In the position number ②, the appropriate expression to check if the method converged to the root is
- `abs(x1-x2) > tol`
 - `abs(x1-x2) < tol`
 - `(x1-x2) < tol`
 - `abs(x1+x2) > tol`
26. The correct formula for Newton method in place number ③ is
- `x2=x1+(f(x1)/fd(x1))`
 - `x2=x1-(fd(x1)/f(x1))`
 - `x2=x1-(f(x1)/fd(x1))`
 - `x2= x1*(f(x1)/fd(x1))`
27. What is the correct way to call the function in the presented MATLAB code?
- `x2=newton(4,0.001)`
 - `x2=(4,0.001)`
 - `function =newton(4,0.001)`
 - `x2=function (4,0.001)`
28. In the false position method of finding the roots of nonlinear equations, the function must be:
- Discontinuous
 - Differentiable
 - Linear
 - Continuous
29. For an equation like $x^2 = 0$, the bisection method cannot be used because the function
- is a polynomial
 - has repeated roots at $x=0$
 - is always non-negative
 - has a slope equal to zero at $x=0$
30. The trapezoidal rule is a method of numerical integration that approximates the area under a curve by:
- dividing the area into rectangles
 - dividing the area into trapeziums
 - dividing the area into triangles
 - none of the above

Question No.2 :

(20 marks)

Determine whether each of the following statements is true or false

(One mark for each question)

31. MATLAB is a programming language specifically designed for numerical computing.
32. The 'clc' command in MATLAB clears all the text from the Command Window, resulting in a clear screen.
33. The variables "A" and "a" are considered to be the same in MATLAB.
34. The 'who' command in MATLAB is used to determine the data type of a variable.
35. In MATLAB, the semicolon (;) is used at the end of a statement to suppress the output and is used as a column separator in an array.
36. The result of the 'diff' command in MATLAB is always a symbolic expression.
37. The 'sqrt' function in MATLAB returns the square of a number.
38. The MATLAB command 'trapz(x,y)' uses trapezoidal integration to compute the integral of y with respect to x.
39. The value of the expression $y = \sin x + \cos 2x$ for $x=\pi/4$ can be computed by using the following MATLAB code:
 `>> x=pi/4;`
 `>> y=sin(x)+ cos(2x)`
40. To solve the equation $xy - y^2 - 5x + 7 = 0$ in terms of x, we use the MATLAB command
 `>> solve('x*y-y^2-5*x+7', 'x')`
41. The 'hold on' command in MATLAB can be used to generate multiple graphs in the same window.

42. The while loop is suitable for situations where the number of iterations is known in advance.
43. We can find the roots of the polynomial x^4+x^3+3 using the MATLAB command `>> roots([1 , 1, 3])`
44. To calculate the $\lim_{x \rightarrow 1} \frac{x-1}{\sin(x-1)}$ in MATLAB, we use the code
`>> syms x;`
`>> limit((x-1)/sin(x-1), x, 1)`
45. To calculate the integration $\int_1^2 \int_0^1 xy \, dy \, dx$, we use the MATLAB code
`syms x; int(int(xy, y, 1, 2), x, 0, 1)`
46. To create a blue sine wave in MATLAB, we use the code
`x=0:0.1:2*pi; y=sin(x);`
`plot(x,y,b)`
47. The bisection method for finding roots of nonlinear equations is an iterative process that reduces the interval size by half in each iteration.
48. Trapezium rule method is a numerical integration method that provides a quadratic approximation to the integral.
49. The convergence of secant method for finding roots of nonlinear equations can be affected by the choice of the initial guesses.
50. Simpson's Rule is a method of numerical integration that requires an even number of equally spaced intervals for the integration interval.

----- End of Questions with Our Best Wishes for Success -----



Dr. Esraa Gamal && Dr. Fatma Hussein