نموذج (٦) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

المادة : الرياضيات البحتة باللغة الإنجليزية (الشعبة العلمية رياضيات) الزمن : ساعتان

أولاً : الأسئلة الموضوعية (الاختيار من متعدد) "كل سؤال درجة واحدة"

(1)	If: $y\,e^{x} = e^{3}$, then $\frac{dy}{dx}$ = ...						
(a)	e^{x}	(b)	$-e^{3-x}$	(c)	$-e^{x-3}$	(d)	e^{3+x}

(2)	$\int \frac{e^{-x}-1}{e^{-x}+x}\,dx$ = ... + c						
(a)	$ln\lvert e^{-x}+x\rvert$	(b)	$-ln\lvert e^{-x}+x\rvert$	(c)	$ln\lvert e^{x}\rvert$	(d)	$ln\lvert x\rvert$

(3)	If the complex number $z = 3 + 4\,i$, then its conjugate is represented in argand diagram by the point						
(a)	(3 , 4)	(b)	(4 , 3)	(c)	(3 , – 4)	(d)	(– 3 , 4)

(4)	In the expansion of $\left(x^{2} + \frac{1}{a\,x}\right)^{12}$ according to the descending powers of x. If the ratio between the coefficient of the term free of x and the coefficient of x^{3} equals 5 : 16 , then a = ...						
(a)	$\frac{1}{5}$	(b)	5	(c)	$\frac{1}{2}$	(d)	2

(5)	If $\vec{A}$ = (1 , m , – 2) , $\vec{B}$ = (4 , 17 , 2) and $\lVert \overrightarrow{AB} \rVert$ = 13, then m ∈						
(a)	{5 , 29}	(b)	{ 5 }	(c)	{ 29 }	(d)	{24 , 29}

(6)	In a coordinate plane, if $\overleftrightarrow{AB}$ is drawn passing through the point C (3 , 2) intercepts the positive coordinate axes at point A and point B, then the minimum area of triangle AOB equals ..... square units. (where O is the origin point)						
(a)	6	(b)	12	(c)	24	(d)	48

(7)	$\int 6\,x\,e^{x^{2}}\,dx$ = ... + c						
(a)	$3\,x\,e^{x}$	(b)	$3\,e^{x}$	(c)	$x\,e^{x^{2}}$	(d)	$3\,e^{x^{2}}$

(8)	If $\overrightarrow{A} = (3, 1, -2)$, then the direction cosine of the angle with the positive direction of the y-axis is = …….						
(a)	$\frac{3}{\sqrt{14}}$	(b)	$\frac{2}{\sqrt{14}}$	(c)	$\frac{1}{\sqrt{14}}$	(d)	$\sqrt{14}$

(9)	In the expansion of $x^2\left(\frac{x^2}{2}+\frac{2}{x^3}\right)^{15}$ according to the descending powers of x. The coefficient of x^{12} equals …….						
(a)	$\frac{1365}{128}$	(b)	$\frac{495}{64}$	(c)	$\frac{3003}{128}$	(d)	$\frac{1001}{16}$

(10)	If the equation of the curve is $y = e^{x+1}$, then the equation of the normal at the point where its x coordinate = – 1 is …….						
(a)	$y - x = 0$	(b)	$y + x = 0$	(c)	$y + x = 2$	(d)	$y - x = 2$

ثانياً : الأسئلة الموضوعية (الاختيار من متعدد) "كل سؤال درجتان"

(11)	If the two planes: $(m, -1, 4)\cdot\vec{r} = 5$ and $3x + 2z = 4 + y$ are perpendicular, then m = …….						
(a)	3	(b)	2	(c)	– 2	(d)	– 3

(12)	If $z_1 = 2(\cos130° + i\sin130°)$ and $z_2 = 3(\cos50° + i\sin50°)$, then $z_1 z_2$ = …….						
(a)	$6^{8\pi i}$	(b)	$-6^{3\pi i}$	(c)	$6^{5\pi i}$	(d)	$-6^{\frac{\pi}{2}i}$

(13)	If the straight line L_1: $\vec{r} = (-2, 3, 1) + t_1(3, -1, 1)$ and L_2: $\vec{r} = (3, -3, 5) + t_2(m, -2, 2)$ are parallel then m = …….						
(a)	6	(b)	3	(c)	– 2	(d)	–5

(14)	If the point (1, 12) is an inflection point for the curve of the function $f: f(x) = a x^3 + b x^2$, then $a - b$ = …….						
(a)	24	(b)	– 24	(c)	12	(d)	– 12

(15)	If $x = \sec z$, $\sqrt{y} = \tan z$, then $\frac{d^2y}{dx^2}$ = ...						
(a)	4	(b)	3	(c)	2	(d)	1

(16)	If $y = f(x)$ where $y = \sec\theta$ and $x = \cos\theta$, then the area bounded by the curve, the x-axis and the lines $x = 1$, $x = e$ equals ..... square units.						
(a)	3	(b)	e	(c)	e^2	(d)	1

(17)	In the expansion of $\left(\sqrt{x} + \frac{1}{x}\right)^8$ according to the descending powers of x. If T_4 , T_5 , 25 T_7 and T_6 are proportion, then $2x$ = ...						
(a)	$\frac{5}{2}$	(b)	$\frac{7}{2}$	(c)	5	(d)	7

(18)	If f (x) = 10 $x\, e^{-x}$, then the absolute maximum value of the function = ... where x ∈ [0 , 4]						
(a)	$\frac{10}{e}$	(b)	$\frac{40}{e^4}$	(c)	$2e$	(d)	zero

ثالثاً: الأسئلة المقالية " كل سؤال درجتان"

(19)	If 1 , ω , ω^2 are the cube roots of the unity, Then prove that: $\left(\frac{\omega}{1+2\omega}\right)^2 + \left(\frac{1+2\omega^2}{\omega^2}\right)^2 = \frac{-10}{3}\omega^2$

(20)	A cube expands upon to heat. If its edge increases at a rate of 0.02 cm/min and its surface area increases at a rate of 0.72 cm²/min, find the rate of increase of its volume at that instant.