## FINAL EXAMINATION

Semester 1, Academic Year 2017-2018 Duration: 120 minutes

SUBJECT: Calculus 2	
Chair of Department of Mathematics	Lecturer:
Signature: P. A. Myn	Signature:  Assoc.Prof. Mai Duc Thanh

- Each student is allowed a maximum of two double-sided sheets of reference material (of size A4 or similar) and a scientific calculator. All other documents and electronic devices are forbidden.
- Each question carries 20 marks.

Question 1. Find all the first and second partial derivatives of  $f(x,y) = \sin(x^2 + 2y)$ 

Question 2. Find all the local maximum and minimum values and saddles point(s) of the function

$$f(x,y) = (2x^2 - y^2)e^{2y}$$

Question 3. Evaluate the double integrals

$$\iint_D (x+2y)dA, \quad D = \{(x,y)|\ 0 \le x \le 3,\ 0 \le y \le 1\}$$

b) 
$$\iint_{D} (x^{2} - 2y) dA, \quad D = \{(x, y) | 0 \le x \le 1, \ 0 \le y \le 3x\}$$

Question 4. Evaluate the line integrals

a)  $\int_C (7xy^4 + 2\sqrt{x}) dy$ , where C is the arc of the curve  $y = \sqrt[9]{x}$  from (1,1) to (9,3). b)  $\int_C \mathbf{F} \cdot d\mathbf{r}$ , where  $\mathbf{F}(x,y,z) = (x+y)\mathbf{i} + (2x-y)\mathbf{j} + (y-z)\mathbf{k}$ , and C is the line segment from (1,0,1) to (4,2,-2).

Question 5. (a) Find curl F and div F if F(x, y, z) = (x + 2yz)i + 3yzj + 4xzkb) Evaluate the surface integral  $\iint_S (3x + 2z) dS$ , where S is the part of the plane  $z = \frac{1}{2}$  1 + 2x + 2y that lies insides the cylinder  $x^2 + y^2 = 1$