Pokhara University

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| Level: Bachelor | Semester – Fall | Year : 2016 |
| Programme: BCIS | | Full Marks: 100 |
| Course: Numerical Methods | | Pass Marks: 45 |
| Time : 3hrs. |

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| *Candidates are required to give their answers in their own words as far as practicable.* |
| *The figures in the margin indicate full marks.* |
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|  | Section "A"  **Very Short Answer Questions**  Attempt all the questions. | 10×2 |
| 1. | What are errors in numerical methods? |  |
| 2. | What is bracketing and non-bracketing method? |  |
| 3. | What is meant by ill-conditioning? |  |
| 4. | Derive the Trapezoidal rule. |  |
| 5. | Derive formula for Laplace and poisson’s equation. |  |
| 6. | Does the following system have a unique solution or not?  X+2y=5  3x+y=5 |  |
| 7. | Using picard method find the solution of dy/dx=1+xy upto second approximation where y(0)=0. |  |
| 8. | Derive the formula for Newton’s Divided and difference. |  |
| 9. | What is initial value problem? Differentiate initial value problem and boundary value problem in brief. |  |
| 10. | Distinguish between ordinary and partial differential equations. |  |
|  | Section "B"  **Descriptive Answer Questions**  Attempt any ***six*** questions | 6×10 |
| 11. | Find the positive root of equation correct up to 5 decimal places using Bisection method. |  |
| 12. | Using power method, Find the largest Eigen value and corresponding Eigen vector of the following matrix. |  |
| 13. | Fit a second degree parabola to the following data:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | X: | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | | Y: | 1.1 | 1.3 | 1.6 | 2.0 | 2.7 | 3.4 | 4.1 | |  |
| 14. | The following table gives the velocity of an object at various points in time:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Time(Seconds) | 1 | 1.2 | 1.6 | 1.8 | 2.2 | 2.4 | 2.8 | | Velocity (m/Sec) | 9 | 9.5 | 10.2 | 11.0 | 13.2 | 14.7 | 18.7 |   Find the acceleration of the object at t=2 Sec. Assume a suitable value for h. |  |
| 15. | Solve the following equations by using Dolittle method.  3x+2y+z=10  2x+3y+2z=14  X+2y+3z=14 |  |
| 16. | Use Romberg's method to compute  correct to 4 decimal places. |  |
| 17. | Solve initial value problem , y(0)=1 to find y(0.4) by using h=0.1. |  |
| 18. | Section "C"  **Case Analysis**  Monthly faculty salary in three departments of an institute is given  below. Assuming that the salary for a particular category is same in all  the departments.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Department | Number of Faculty | | | Total Salary  (in thousand) | | Professor | Asst. Professor | Lecturer | | A | 2 | 2 | 4 | 60 | | B | 3 | 1 | 2 | 50 | | C | 1 | 4 | 3 | 60 |  1. Model above problem into system of linear equation to determine the salary of each category of faculty. 2. Calculate the salary of each category of faculty 3. Write an algorithm to compute above problem. | 20 |