**MoDEL Question**

**Pokhara University**

**Time Bound Open Book Hybrid Examination**

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| Level: Bachelor |  | Full Marks: 70 |
| Program: BE | | Pass Marks: 31.5 |
| Course: Physics | | Time : 2 hrs. |

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.*

***Attempt all the questions.***

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| 1. | If you are given a diffraction grating having (r+1400) lines per inch (r is the last digit of your Exam roll number) and light of wavelength (5000+c) A0 (c is the last digit of your Exam roll number), find the highest order of light that are visible.  OR  You are given a mass spring system with mass = (100+z) gm (z is the last digit of your Exam roll number), how will you determine the spring constant? Describe the technique with mathematical rigor. | 10 |
| 2. | You are told that the electric potential at the center of a square of finite size is zero. Is this only because the charges at the vertices are zero? Defend your answer with numerical examples (In your example, use the last digit of your exam roll number). | 10 |
| 3. | The volume of a room is (700-c) m**2** (c is the last digit of your exam roll number). The wall area of the room is 640 m**2**, ceiling area 25 m**2** and floor area is 25 m**2**. The average sound absorption coefficient (i) for wall is 0.01, (ii) for ceiling is 0.60 and (iii) for the floor is 0.04. Calculate the average sound absorption coefficient and the reverberation time. | 10 |
| 4. | You have been studying about ‘Charge’ since school. In your ‘Engineering Physics’ course too, you have studied the various properties of ‘Charge’. Distinguish each property from the rest. Critically examine all those properties with the corresponding theories in Physics. Has any of these theories of ‘Charge’ helped in shaping the technology? Express your opinion. | 10 |
| 5. | You have been asked to construct a He-Ne Laser. What raw materials do you need? Which principle of physics is applied here? Critically examine it with Ruby Laser in detail. Has Laser light ever been useful in your life? Share your own story. | 10 |
| 6. | You are given a 20 H inductor placed in series with (1+y )Ω (y is the last digit of your exam roll number) and (1+z) V (z is the last digit of your exam roll number) battery. At 0.4 second after the contact is made, (i) At what rate does the battery deliver energy? (ii) At what rate does energy appear as Joule heat in the resistor? (iii) At what rate does the inductor store energy? (iv) Is conservation of energy violated here? Defend your answer with mathematical reasoning. | 20 |