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K I I T U N I V E R S I T Y
K I I T E E – 2 0 1 1

Answer Sheet No.								

QUESTION BOOKLET

B.TECH (4YEARS) /B.TECH & M.TECH- DUAL DEGREE / B.TECH & MBA- DUAL DEGREE / MBBS/BDS/ B.SC NURSING / BIOTECHNOLOGY- DUAL DEGREE

PHYSICS & CHEMISTRY (PART-I)

Important Instructions

1. Use only **Blue/Black** Ball Point Pen to Fill up the Particulars on the Question Booklet and Answer Sheet and also for marking the responses on the Answer Sheet. **Use of Pencil is strictly prohibited**.
2. Immediately Fill in the Particulars asked on this page & on the answer sheet very carefully. Write the Application number and Roll Number, asked in the Answer Sheet very neatly and darken the respective circle.
3. Write the Answer Sheet Number on the Attendance Sheet, as mentioned in the Answer Sheet.
4. Open the seal of the Question Booklet after getting necessary instructions from the invigilator. This Question Booklet contains 24 pages.
5. After opening the seal, check all the pages of the question booklet. If there is any discrepancy, report to the invigilator immediately for change of question booklet.
6. This question Booklet consists of **100** multiple choice questions each carrying **+4** for correct response, **-1** for incorrect response and **0** for no response.
7. The Test is of **two hours** duration.
8. Handle the Question Booklet and Answer Sheet with care.
9. Don't do any rough work or writing work on Answer Sheet. All calculations / writing works are to be done in the space provided for the purpose in the Question Booklet itself marked 'Space for Rough Work'.
10. On demand, show the admit card to the invigilator.
11. The candidates are governed by the Rules and Regulation of the University with regard to their conduct in the Examination Hall / Room.
12. Candidates are not allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, electronic device, electronic / manual calculator, drawing instruments (such as scale, compass etc.) or any other material except the Admit Card and Ball Point Pens inside the Examination Hall / Room.
13. No Part of the Question Booklet and Answer Sheet shall be detached or folded or defaced under any circumstances.
14. Before handing over the Answer Sheet to the invigilator, confirm that your Answer Sheet has been signed by the Invigilator.
15. On completion of the test, handover the Answer Sheet to the invigilator. At no circumstances, you will be allowed to leave the examination hall / room without handing over the Answer Sheet to the Invigilator.

Name of the Candidate _____Roll No. _____

Examination Centre _____

Candidate's Signature Invigilator's Signature

PHYSICS

1. A disk of radius 10 cm has a moment of inertia of 0.02 kg.m^2 about its central axis. A force of 15 N is applied tangentially to the periphery of the disk to give it an angular acceleration of magnitude

   (A) 25 rad/s^2 (B) 35 rad/s^2
   (C) 45 rad/s^2 (D) 75 rad/s^2

2. A uniform hollow cylinder has a density ρ, a length 'L', an inner radius 'a', and an outer radius 'b'. Its moment of inertia about the axis of the cylinder is (Mass of the cylinder is 'M')

   (A) $M\left(b^2+a^2\right)$ (B) $2M\left(b^2+a^2\right)$
   (C) $\frac{M}{2}\left(b^2+a^2\right)$ (D) $\frac{3M}{4}\left(b^2+a^2\right)$

3. Starting from rest, a sphere rolls down a 30^o incline. To avoid slipping, the minimum value of the coefficient of static friction should be

   (A) 0.165 (B) 0.145 (C) 0.135 (D) 0.125

4. The velocity of a particular mass 'm' is $\vec{v}=(5\hat{i}+4\hat{j}+6\hat{k})$m/s when at position $\vec{r}=(-2\hat{i}+4\hat{j}+6\hat{k})$ m. The angular momentum of the particle about the origin is

   (A) $m\left(42\hat{i}-28\hat{k}\right)$ kg m^{2}s^{-1} (B) $m\left(42\hat{j}-28\hat{k}\right)$ kg m^{2}s^{-1}
   (C) $m\left(42\hat{i}+28\hat{k}\right)$ kg m^{2}s^{-1} (D) $m\left(42\hat{j}+28\hat{k}\right)$ kg m^{2}s^{-1}

5. The increase in pressure required to decrease the volume of 200 L of water by 0.004% is (Bulk modulus of water is 2.1x10^9 N/m^2)

   (A) 8.4x10^4 N/m^2 (B) 8.4x10^3 N/m^2
   (C) 8.4x10^5 N/m^2 (D) 8.4x10^6 N/m^2

6. A object suspended from a spring exhibits oscillations of period T . Now the spring is cut in half and the two halves are used to support the same object. The new period of oscillation is

   (A) T (B) 2T (C) T/2 (D) T/4

7. A mercury barometer stands at 762 mm. A gas bubble, whose volume is 33 cm^3 when it is at the bottom of a lake 45.7 m deep, rises to the surface. The volume of the bubble at the surface of the lake is

   (A) 105 cm^3 (B) 178 cm^3 (C) 248 cm^3 (D) 351 cm^3

8. A hole of area 1 mm^2 opens in the pipe near the lower end of a large water storage tank, and a stream of water shoots from it. If the top of the water in the tank is 20 m above the point of the leak, the amount of water escapes in 1 s is

   (A) 87.5 cm^3/s (B) 43.1 cm^3/s
   (C) 27.5 cm^3/s (D) 19.8 cm^3/s

54. Which of the following statement is true for an ideal solution?

(A) $\Delta V_{mixing}=0$, $\Delta H_{mixing} = 0$ and Raoult's law is obeyed

(B) $\Delta V_{mixing}=0$, $\Delta H_{mixing} = 0$ and positive and negative deviation from the Raoult's law are observed.

(C) $\Delta V_{mixing}=0$, $\Delta H_{mixing} \neq 0$ and Raoult's law is obeyed

(D) $\Delta V_{mixing} \neq 0$, $\Delta H_{mixing} = 0$ and Raoult's law is obeyed

55. Which of the following is NOT a state function?

(A) work (B) enthalpy

(C) internal energy (D) free energy

56. For a reaction: $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, ΔH and ΔU are related as

(A) $\Delta H = \Delta U + 2RT$ (B) $\Delta H = \Delta U - 2RT$

(C) $\Delta H = \Delta U$ (D) $\Delta H = \Delta U + 4RT$

57. The rate of a reaction (r) for $2NO_2 \rightarrow 2NO + O_2$ can be expressed in terms of NO_2 as

(A) $r = -2.\frac{d[NO_2]}{dt}$ (B) $r = +\frac{1}{2}.\frac{d[NO_2]}{dt}$

(C) $r = -\frac{1}{2}.\frac{d[NO_2]}{dt}$ (D) $r = 2.\frac{d[NO_2]}{dt}$