

SEAT No. _____

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SARDAR PATEL UNIVERSITY

6th Semester B. Sc. (Under CBCS) Examination 2018

Wednesday, 28th March 2018

Time: 10:00 am to 1:00 pm

Subject: PHYSICS [US06CPHY02]

[Atomic - Molecular Physics, Energy Science and Earth Science]

Total Marks: 70

- N.B: (i) All the symbols have their usual meanings.
(ii) Figures at the right side of questions indicate full marks.

Q.1 Answer the following Multiple Choice Questions.

(10)

- The alkaline earth elements contain ____ valence electrons outside the close shell.
(a) one (b) two
(c) three (d) four
- The band spectra are also known as ____ spectra.
(a) band (b) atomic
(c) molecular (d) emission
- The Lyman series lies in the ____ region of the EM spectrum.
(a) far Infra-red (b) visible
(c) Infra-Red (d) UV
- The separation of the nuclear and electronic motion is embodied in the ____ approximation.
(a) Born-Oppenheimer (b) Max Planck
(c) Heisenberg (d) Hamilton
- ____ molecule does not exhibit pure rotational spectra.
(a) HCl (b) H₂ (c) HI (d) NH₃
- Power delivered by a PV cell is maximum at ____ point.
(a) Knee (k) (b) Short circuit(SC)
(c) Open circuit(OC) (d) None of these
- In simple flat plate collectors transparent of glass sheets placed on the upper side of the absorber plate to reduce ____ losses.
(a) Thermal (b) Refraction
(c) Reflection (d) Shadow
- The total power P_t in the wind stream is directly proportional to ____.
(a) Square of area of stream (A^2) (b) Wind density(ρ)
(c) Incoming wind velocity(V_i) (d) Efficiency factor(η)
- The ozone layer lies within ____.
(a) Mesosphere (b) Troposphere
(c) Stratosphere (d) None of these
- The oceanic crust mainly consists of ____.
(a) Igneous rocks (b) Granite rocks
(c) Sand stones (d) Tholeiitic basalt

(2)

(P.T.O.)

Q.2. Answer the following questions in short. (Attempt Any Ten) (20)

- 1) Write Bohr assumptions for the spectrum of Atomic hydrogen.
- 2) State Ritz combination principle.
- 3) Explain in brief: Ortho-positronium and Para-positronium.
- 4) Differentiate between Raman spectra and Infra-Red spectra.
- 5) Explain in brief Vibration-Rotational type of molecular spectra.
- 6) Define a Non-rigid rotator.
- 7) Enlist the factors required for the planning of a wind farm.
- 8) Explain in brief cosine loss factor.
- 9) Draw schematic diagram of a fuel cell power plant.
- 10) Enlist different types of major plates.
- 11) Using Newton's law of gravitation obtain equation for density (Δ) of the earth.
- 12) Explain in brief divergent and convergent boundaries.

- Q.3. a) Explain Stern-Gerlach experiment with proper diagram. What is its importance? (06)
b) State the salient features of alkali spectra. (04)

OR

- Q.3. a) Explain the Frank-Hertz experiment with suitable diagram. Also state its importance. (06)
b) Explain about various series observed in the hydrogen spectrum in terms of wave number. (04)

- Q.4. What is Raman effect? Write the salient features of Raman spectra. Explain it with experimental set-up in detail. (10)

OR

- Q.4. What are "Rotational spectra"? Write its salient feature. Derive the equation for rotational energy (E_r) of a rigid diatomic rotator (molecule) in terms of rotational quantum number (J). (10)

- Q.5. a) Name essential subsystem of a complete solar thermal energy conversion plant. Give schematic diagram of such plant. (05)
b) Explain $V \rightarrow I$ characteristics of a solar cell with proper test condition diagram. (05)

OR

- Q.5. a) Giving neat labeled diagram explain twin blade HAWT. (05)
b) Mention about the advantages of fuel cell power sources. (05)

- Q.6. a) Discuss how to determine the Epicenter and the focus of an earthquake. (06)
b) Discuss the influence of the sun and the moon on the earth. (04)

OR

- Q.6. a) Explain - The crust and its chemical compositions with its influence. (06)
b) What are seismographs? Explain in brief vertical pendulum type of seismograph. (04)