Science and Technology

1. LIGO:
   - Laser interference gravitational waves observatory (2 Observatory is USA: Livingston, Louisiana and Hanford, Washington. Funded by National science foundation
   - It is large scale physic experiment & observatory to detect cosmic gravitational waves to make it as astronomical tool.
   - In 2016 gravitational waves is reported by LIGO scientist collaboration.
   - In April 2016, India and US had signed an MoU to set up the LIGO Observatory-US National Science Foundation (NSF) and India's Department of Atomic Energy (DAE).
   - LIGO India Project at Maharashtra Dudhala village in Hingoli district.

2. Smart Grid:
   - Power grid chairman and director R.N.Nayak.
   - Used for electronic power conditioning, distribution of electricity, improve fault detection and allow self-healing of network.
   - Tackle an out-of-control electricity theft problem and improve reliability.
   - In November 2014, Prime Minister Modi announced $4bn in funding for smart metering programs.
   - Over $8bn is available for loss reduction programs.

3. HVDC: High voltage direct current
   - Alstom (vice president-Patric Plas) company collaborated with PGCIL.
   - It transmit electricity over large distance & separate power source is interconnected easily.
   - Electric power is taken from one point in 3 phase AC N/W, converted to DC and transmitted to receiving point by cable and then converted back to AC (reduce loss).
   - Categories of HVDC: Point to point transmission, Back to back station, Multi terminal system.
   - Advantage: low investment cost, low loss, long distance water crossing, controllability, limited short circuit current, environmentally superior, allow interconnection of asynchronous N/W.

4. Cloud Computing:
   - It means delivering of hosted service over the internet and using this network of remote server to store, manage and process data rather than local server or personal computer.
   - It is on demand network access and it save cost.
   - For every employee new software is needed to install in their PC which might cost high. So with cloud computing we can install software to remote server and give access to every employee.
5. Bio Glass: developed by Lary Henches
   - It is special component of glasses that contains some component which is accepted by living bones.
   - Scientists from Imperial College London in the UK and University of Milano-Bicocca in Italy have developed a bio-glass material that mimics the shock-absorbing and load bearing qualities of real cartilage.
   - The bio-glass consists of silica and a plastic or polymer called polycaprolactone.
   - Artificial body parts are printed using 3D printer with exactly same specification of patient organs.
   - It is proved as minerals for teeth which gets dissolve into teeth and reduce sensitivity.

6. Li-Fi: Light Fidelity

- It is based on visible light concept. So no radiation problem.Developed by Harald Hass.
- Internet is passed through lamp driver to LED which gets received by photo receptor. After amplification is done it received by receiver as an output of photo detector at computer end.
- More than single user can access internet simultaneously. No interference will be experienced unlike Wi-Fi because of less Bandwidth.
- Range is extended to area which is covered by light. Therefore it is secure and wasted less.
- Due to limited area under light Li-Fi shows high data density.

- Data Rate of Li-Fi is 100 Gbps whereas Wi-Fi has 7 Gbps.

7. Augmented Reality Technology:
   - It uses existing environment to overlay new information on top of it.
   - It is a special 3D programming which allow developer to tie animation (contextual digital information) in real world.
   - It includes GPS & compass to detect device orientation.
   - Used for military training as machine vision, object recognition & gesture recognition.
   - Union Government has launched Augmented Reality technology based mobile application named 'Sakaar' to highlight the achievements of the Department of Space.
   - The application consists of 3 Dimensional (3D) models of Mars Orbiter Mission (MOM), RISAT, indigenous rockets such as PSLV, GSLV Mk-III.

8. Cloud Seeding:
   - Process of spreading either dry ice or silver iodide to encourage growth of new ice particles.
   - Silver iodide aerosol is sprinkled at upper part of cloud to simulate precipitation process to form rain.
   - Disadvantage: Costly, not an efficient technique, environmental imbalance.

9. Hybrid Vacuum Toilet:
   - Toilet evacuate discharge into biodigester tank which is fitted underneath coach and contains anaerobic bacteria that converts human waste into water & gases before discharging into tracks.
   - Conventional toilet uses 10-15 liters of water whereas hybrid uses only 500ml water.

10. ISRO launches 8 satellites:
    - It is also for the first time PSLV has successfully placed satellites in two different orbits in single mission.
    - Three satellites were from India, three from Algeria (Alsat-1B, 2B, Nano)and one each from Canada (NLS-19) and United States (pathfinder-I).
    - SCATSAT-1 satellite: provide weather forecasting services
    - Pratham: satellite developed by students from IIT Bombay. It will be used to study the total electron count in space with a resolution of 1km x 1km location grid.
    - PISAT: satellite made by students of Bengaluru's PES University. It will take pictures of earth for remote sensing applications.

11. Telangana sign MoU with ISRO to promote education:
    - The MoU was inked between Department of IT, Electronics & Communication of Telangana and ISRO's Development & Educational Communication Unit (DECU).
    - ISRO will help to improve services of Telangana's educational channel 'Mana TV' by using Satcom.

- Mana TV will also launch similar coaching programmes for the students preparing for various competitive examinations.

12. GSAT-18:

- India's latest communication satellite GSAT-18 was successfully launched from the spaceport of Kourou in French Guiana.
- Carries 48 communication transponders including Ku-band beacon for accurately pointing ground antennas towards the satellite.
- Provide services like television, telecommunication, VSAT and digital satellite news gathering.