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BPSC 2018

PRELIMINARY EXAMINATION

Assistant Engineer

General Paper

CIVIL ENGINEERING

Date of Exam: 15-09-2018

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1. The Bhartiya Nabhikiya Vidyut Nigam Limited (BHAVINI) is in which State?
    (A) Gujarat (B) Andhra Pradesh
    (C) Bihar (D) Tamil Nadu

Ans. **(D)**
    The Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI) is a wholly owned Enterprise of Government of India under the administrative control of the Department of Atomic Energy (DAE). It is headquartered at Chennai, Tamil Nadu.

2. The scientific objective of ASTROSAT mission is
    (A) to study the surface of the earth
    (B) to study the moon
    (C) to study the distant celestial sources
    (D) to study the mars

Ans. **(C)**
    • AstroSat is the first dedicated Indian astronomy mission aimed at studying celestial sources in X-ray, optical and UV spectral bands simultaneously.
    • One of the unique features of AstroSat mission is that it enables the simultaneous multi-wavelength observations of various astronomical objects with a single satellite.

3. Biodegradables are the substances
    (A) that are inert
    (B) that persist in environment for a long time
    (C) that may harm the various members of the ecosystem
    (D) that are broken down by biological processes

Ans. **(D)**
    Biodegradation is the disintegration of materials by bacteria, fungi, or other biological means. Biodegradable matter is generally organic material that provides a nutrient for microorganisms.

4. 'SATYAM' program of Government of India is related to
    (A) sports and culture
    (B) yoga and meditation
    (C) Gandhian principles
    (D) clean India campaign

Ans. **(B)**
    Government of India has launched a new programme called SATYAM (Science and Technology of Yoga and Meditation) to strengthen research in the areas of yoga and meditation.

5. What is the full form of 'CSIR'?
    (A) Cognitive Science Initiative for Research
    (B) Community for Science and Industrial Research
    (C) Council of Scientific and Industrial Research
    (D) Center for Scientific and Industrial Research

Ans. **(C)**
    The Council of Scientific and Industrial Research (CSIR) was established by the Government of India as an autonomous body for research and development purposes.

6. Who is known as the 'Missile Woman of India'?
    (A) Tessy Thomas
    (B) Padmasree Warrior
    (C) Ruchi Sanghvi
    (D) Kalpana Chawla

Ans. **(A)**
    Tessy Thomas is an Indian scientist and the former Project Director for Agni-IV missile in Defence Research and Development Organisation (DRDO). She is the first woman scientist to head a missile project in India. She

is popularly known as the 'Missile Woman of India'.

7. Which of the following is a 'surface-to-air missile?
(A) Agni   (B) Prithvi
(C) Akash   (D) Astra

Ans. (C)
The Akash is a mid-range surface-to-air missile (SAM) system built by India's state-owned Defence Research and Development Organisation (DRDO).

8. The objective of the national program 'The Kishore Vaigyanik Protsahan Yojana' (KVPY) is
(A) to identify students with talent and aptitude for engineering studies
(B) to identify young scientists for national level awards
(C) to attract talent to the study of science at an early age
(D) to identify students with talent and aptitude for research and encourage them to take up research career in science

Ans. (D)
Kishore Vaigyanik Protsahan Yojana (KVPY) is a scholarship program funded by the Department of Science and Technology of the Government of India, aimed at encouraging students to take up research careers in the areas of basic sciences.

9. Chemotherapy is the treatment of diseases by using
(A) X-rays
(B) infrareds
(C) chemicals
(D) radioactive elements

Ans. (C)
Chemotherapy is a drug treatment that uses powerful chemicals to kill fast-growing cells in a body. Chemotherapy is most often used to treat cancer, since cancer cells grow and multiply much more quickly than most cells in the body.

10. Richter scale is a/an _____ scale to measure earth tremors.
(A) exponential   (B) logarithmic
(C) linear   (D) geometric

Ans. (B)
• The Richter scale is a scale of numbers used to tell the intensity of earthquakes. Earthquakes 4.5 or higher on the Richter scale can be measured by tools all over the world.
• The Richter scale is logarithmic, with a base of 10.

11. Human genome project endeavours to
(A) decode DNA
(B) invent AIDS treatment
(C) study of evolution of human
(D) study of fingerprints

Ans. (A)
The Human Genome Project (HGP) - an international scientific research project aims to determine the sequence of nucleotide base pairs that make up human DNA, and of identifying and mapping all of the genes of the human genome from both a physical and a functional standpoint.

12. Cryogenic engine uses_____ as fuel.
(A) gases in liquid form
(B) uranium
(C) water in gaseous form
(D) oxygen or hydrogen in gaseous form

Ans. (A)
A cryogenic rocket engine uses cryogenic fuels or oxidizers which are basically liquefied gases and stored at very low temperatures.

13. The instrument used to observe a distant object is called
(A) stethoscope   (B) microscope
(C) telescope   (D) endoscope

Ans. (C)
Telescopes are optical instruments that make distant objects appear magnified by using an arrangement of lenses or curved mirrors or various devices used to observe distant objects by their emission, absorption, or reflection of electromagnetic radiation.

14. Engineer's Day in India is celebrated on the birth anniversary of

(A) Sir C. V. Raman
(B) Shri C. Kumar N. Patel
(C) Professor Meghnad Saha
(D) Shri M. Visvesvaraya

Ans. (D)
Every year India celebrates Engineer's Day on September 15 which is the birth anniversary of Mokshagundam Visvesvaraya. He was India's most prolific civil engineer, dam builder, economist and statesman.

15. Which of the following is the world's fastest supercomputer?
(A) Sunway TaihuLight
(B) Titan
(C) Summit
(D) Tianhe-2

Ans. (C)
• As of June 2018, Summit of United States is the fastest supercomputer on the TOP500 supercomputer list. The Summit can process 200,000 trillion calculations per second - or 200 petaflops.
• China's Sunway TaihuLight supercomputer, until now was the world's most powerful supercomputer, has a processing power of 93 petaflops.

16. A central computer that holds collections of data and programs for many PCs, workstations and other computers is a
(A) server   (B) microprocessor
(C) supercomputer   (D) cloud

Ans. (A)
A server is a central computing device or computer program that provides functionality for other programs or devices, called "clients". This architecture is called the client–server model, and a single overall computation is distributed across multiple processes or devices.

17. 'Project Loon' sometimes in news is developed by
(A) Apple   (B) ISRO
(C) Microsoft   (D) Google

Ans. (D)
Project Loon is a project of Google which involves sending hot air balloons to the stratosphere in order to deliver Wi-Fi access to rural and underserved areas.

18. The Internet Intelligence Map is recently launched by
(A) Oracle   (B) Google
(C) Microsoft   (D) Apple

Ans. (A)
Oracle has launched Internet Intelligence Map, which provides the users with a simple, graphical way to track the health of the internet and gain insight into the impact of events such as natural disasters or state-imposed interruptions.

19. Which city tops in the 4G connectivity among 20 of India's largest cities?
(A) Bengaluru   (B) Patna
(C) Kolkata   (D) Lucknow

Ans. (B)
• According to a report from OpenSignal, a wireless coverage mapping company, Patna tops in 4G connectivity among 20 of India's largest cities. It has emerged ahead of Bengaluru, Mumbai and Delhi.
• The 4G user experience in the 20 cities was monitored for 90 days from December 1, 2017.
• Four cities from India's central and eastern regions, namely Patna, Kanpur, Allahabad, Kolkata, Bhopal and Lucknow made it to the top 10 while popular tech hubs Bengaluru are at 10, followed by Hyderabad, Mumbai and Delhi.

20. What is the name of the new malware which takes over electronic devices and make them 'bots'?
(A) Saposhi   (B) Ransomware
(C) Mirai   (D) Trojan horse

Ans. (A)
Cybersecurity agencies detected a new malware Saposhi, which can take over electronic devices and turning them into 'bots', which can further be used for Distributed Denial of Service (DDoS) attacks.

21. With which organization, NITI Aayog signed a pact on latest technologies including robotics and artificial intelligence?
(A) NASA (B) IRobot
(C) Google (D) ABB Group

Ans. (D)
NITI Aayog and ABB Group inked a pact to reap the benefits of latest technologies including robotics and artificial intelligence. The initiative also covers the fast growing segment of electric mobility. They will work with government ministries, solicit feedback for areas critical to them and discuss solutions using industrial automation, and digitalization technologies.

22. BGR-34 often seen in news is a / an
(A) anti-diabetic ayurvedic drug
(B) indigenously developed rice variety
(C) India's anti-tank missile
(D) type of fertilizer

Ans. (A)
The Council for Scientific and Industrial Research (CSIR) has launched the country's first anti-diabetic ayurvedic drug named BGR-34 for type-2 Diabetes mellitus.

23. The principle of dialysis is based on
(A) gravity flow (B) centrifuge
(C) diffusion (D) Pascal's law

Ans. (C)
• Dialysis works on the principles of the diffusion of solutes and ultrafiltration of fluid across a semi-permeable membrane.
• Diffusion is a property of substances in water; substances in water tend to move from an area of high concentration to an area of low concentration.

24. 'El Nino' event is associated with
(A) solar activity
(B) computer technology
(C) sports
(D) weather

Ans. (D)
• El Niño is a climate cycle in the Pacific Ocean with a global impact on weather patterns.

The cycle begins when warm water in the western tropical Pacific Ocean shifts eastward along the equator toward the coast of South America.
• It is opposite of La Nina, which is a cooling. As the ocean is one of the biggest influences in our weather, both of the phenomena have a dramatic effect on the weather around the globe.

25. The device in communication satellites which receives signals from an earth station and transmits them to different directions is
(A) transducer (B) transponder
(C) transistor (D) solar panel

Ans. (B)
A transponder receives and transmits radio signals at a prescribed frequency range. After receiving the signal a transponder at the same time broadcasts the signal at a different frequency.

26. Which country assisted India to establish Koodan-Kulam Nuclear Power Station in Tamil Nadu?
(A) Russia (B) France
(C) Germany (D) Canada

Ans. (A)
Kudankulam Nuclear Power Plant is a nuclear power station, situated in the Tirunelveli district of Tamil Nadu. It has been built in collaboration with Atomstroyexport, the Russian state company and Nuclear Power Corporation of India Limited (NPCIL).

27. Which of the following national laboratories is dealing with research and development work on radiation technology?
(A) PRL (B) NCL
(C) ISRO (D) BARC

Ans. (D)
• The Bhabha Atomic Research Centre (BARC) is India's premier nuclear research facility headquartered in Trombay, Mumbai, Maharashtra.
• BARC is a multi-disciplinary research centre with extensive infrastructure for advanced

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Engineering Discipline

- 8 Multiple Subject Tests of 75 Questions **600 Ques** (Time : 90 minutes)

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research and development covering the entire spectrum of nuclear science, engineering and related areas.

28. With reference to 'cloud seeding', which statement is true?
    (A) It is a process of enhancing agricultural yield
    (B) It is a technique for carbon sequestration
    (C) It is a process of weather modification
    (D) It is a process of storing large amount of digital data

Ans. (C)
    • Cloud seeding is a type of weather modification that aims to change the amount or type of precipitation that falls from clouds, by dispersing substances into the air.
    • The most common chemicals used for cloud seeding include silver iodide, potassium iodide and dry ice (solid carbon dioxide).

29. Plants which grow in water of high salinity are called
    (A) xerophytes   (B) mesophytes
    (C) hygrophytes   (D) halophytes

Ans. (D)
    A halophyte is a plant that grows in waters of high salinity, coming into contact with saline water through its roots. These are found in saline semi-deserts, mangrove swamps, marshes and sloughs and seashores.

30. Where does the Kuiper belt located in our solar system?
    (A) Between Mars and Jupiter
    (B) Beyond Neptune
    (C) Between Jupiter and Saturn
    (D) Between Uranus and Neptune

Ans. (B)
    • **Kuiper belt**, also called **Edgeworth-Kuiper belt**, flat ring of icy small bodies that revolve around the Sun beyond the orbit of the planet Neptune.
    • It was named for the Dutch American astronomer Gerard P. Kuiper and comprises hundreds of millions of objects- presumed to be leftovers from the formation of the outer planets.

31. With reference to an "ultra thin artificial leaf, which of the following statements is true?
    (A) It is used to generate hydrogen fuel from water
    (B) It is used in generation of electricity
    (C) It is used to cure cancer
    (D) It converts light energy into chemical energy

Ans. (A)
    • Scientists from Council of Scientific and Industrial Research (CSIR) have developed an artificial leaf that absorbs sunlight to generate hydrogen fuel from water.
    • The device consists of semiconductors stacked in a manner to simulate the natural leaf system. When visible light strikes the semiconductors, electrons move in one direction, producing electric current. The current almost instantaneously splits water into hydrogen – which researchers believe is one of the cleanest forms of fuel as its main byproduct is water.

32. 'Sohum' is a/an
    (A) hearing screening device
    (B) cobot
    (C) robot
    (D) anti-tank guided missile

Ans. (A)
    • The Union Ministry of Science and Technology has launched SOHUM, an indigenously developed low-cost hearing screening device for newborns.
    • The innovative medical device has been developed by the School of International Biodesign (SIB) startup Sohum Innovation Labs India Pvt Ltd under Department of Biotechnology (DBT).

33. 'Sagar Vani' sometimes in news is a/an
    (A) integrated information dissemination system
    (B) space program to study the ocean
    (C) floating dock established in Indian Ocean
    (D) program to extract oil from the ocean floor

Ans. (A)
    The Union Ministry of Earth Science has launched Sagar Vani, which is an integrated information

dissemination system that will serve the coastal community, especially the fishermen community with the advisories and alerts towards their livelihood as well as their safety at Sea.

34. Which of the following is *not* a language for computer programming?
(A) BASIC   (B) COBOL
(C) WINDOWS   (D) PASCAL

Ans. (C)
- Microsoft Windows is a group of several graphical operating system families, all of which are developed, marketed, and sold by Microsoft.
- COBOL, FORTRAN, BASIC, Pascal, Ada, and C++ are high-level languages for computer programming.

35. Which of the following are used in mobile communication system?
(A) Microwaves   (B) Sound waves
(C) Ultrasonic waves (D) X-rays

Ans. (A)
Every mobile phone conversation involves the transmission of microwave signals. These have different wavelengths.

36. Non-metal iodine is used
(A) for purification of soil
(B) for purification of water
(C) for vulcanization of rubber
(D) to make antiseptic solution

Ans. (D)
Non-metal Iodine is used in the purple coloured solution (Iodine solution) on wounds as antiseptic.

37. 'Project 75' sometimes in news is related to
(A) Indian space program
(B) Indian Navy's submarine program
(C) anti-tank guided missile program
(D) program to control pollution in 75 cities of India

Ans. (B)
- Project 75 is Indian Navy's submarine programme under which 6 Scorpene submarines are being built with assistance

and technology transfer from DCNS of France under deal signed in October 2005.
- The Scorpene class submarines are a class of diesel-electric attack submarine.

38. 'Project Sunshine' aims to combat which of the following?
(A) Infant death   (B) TB
(C) Malaria   (D) AIDS

Ans. (*)
- Union Minister of Health and Family Welfare J P Nadda has launched **Project Sunrise** on for prevention of AIDS especially among people injecting drugs in the 8 North-Eastern states.
- The AIDS prevention special project aims to diagnose 90 per cent of such drug addicts with HIV and put them under treatment by 2020.

39. Ozone layer is located in
(A) thermosphere   (B) mesosphere
(C) stratosphere   (D) troposphere

Ans. (C)
The Ozone layer or ozone shield is a region of Earth's stratosphere that absorbs most of the Sun's ultraviolet radiation.

40. Which of the following processes is used to treat contaminated media by altering environmental conditions to simulate growth of microorganism?
(A) Bioaccumulation (B) Bioaugmentation
(C) Biodegradation (D) Bioremediation

Ans. (D)
Bioremediation is the process which deals with the use of living organisms such as microbes and bacteria to remove contaminants, pollutants and toxins from soil and water. It can be used to clean up environmental problems like an oil spill or contaminated groundwater.

41. The IC-chip used in computers is made of
(A) silicon   (B) chromium
(C) silica   (D) iron oxide

Ans. (A)
An integrated circuit (IC) or monolithic integrated circuit is a set of electronic circuits on one small

flat piece of semiconductor material, normally silicon.

42. The headquarters of "International Solar Alliance' is located in
(A) Paris   (B) Bonn
(C) Haryana   (D) Bihar

Ans. (C)
- The International Solar Alliance (ISA) is an alliance of more than 121 countries, most of them being sunshine countries, which lie either completely or partly between the Tropic of Cancer and the Tropic of Capricorn.
- It is headquartered in Gurugram, Haryana.

43. The World Congress on Information Technology (WCIT) was recently held in India. It was organized by
(A) NASSCOM   (B) CSIR
(C) NIIT   (D) IIT

Ans. (A)
The World Congress on Information Technology (WCIT-2018), the first in the annual series was hosted by the National Association of Software and Services Companies (NASSCOM) in Hyderabad, Telangana.

44. Recently ISRO has entered into Technology Transfer Agreement with which of the following companies?
(A) NTPC   (B) BHEL
(C) L&T   (D) ONGC

Ans. (B)
ISRO has entered into a Technology Transfer Agreement (TTA) with Bharat Heavy Electricals Limited (BHEL) to transfer the technology for the manufacture of space grade Li-Ion cells.

45. 'Science City' in India are developed by
(A) the Ministry of Science and Technology
(B) the Ministry of Commerce and Industry
(C) the Ministry of Defence
(D) the Ministry of Culture

Ans. (D)
- The Ministry of Culture operates Scheme for Promotion of Culture of Science (SPOCS)

which provides for setting up of Science Cities and Science Centres in all the States of the country subject to availability of funds for the purpose.
- States willing to avail of this Scheme have to provide land and share the cost of setting up of facility and corpus for upkeep and maintenance.

46. Bureau of Energy Efficiency is an agency of the Government of India under
(A) the Ministry of Science and Technology
(B) the Ministry of Commerce and Industry
(C) the Ministry of Power
(D) the Ministry of Agriculture

Ans. (C)
- The Bureau of Energy Efficiency is an agency of the Government of India, under the Ministry of Power, created in March 2002 under the provisions of the Energy Conservation Act, 2001.
- The agency's function is to develop programs which will increase the conservation and efficient use of energy in India.

47. India-based neutron observatory, was recently in news, will be established in
(A) Tamil Nadu
(B) Andhra Pradesh
(C) Bihar
(D) Uttar Pradesh

Ans. (A)
- The India-based Neutrino Observatory (INO) Project is a multi-institutional effort aimed at building a world-class underground laboratory with a rock cover of approx.1200 m for non-accelerator based high energy and nuclear physics research in India.
- It is a particle physics research project under-construction to primarily study atmospheric neutrinos in a 1,300 meters deep cave under Ino Peak near Theni, Tamil Nadu (India).

48. Which among the following is *not* a part of Indian Antarctic Program?
(A) Dakshin Gangotri
(B) Maitri

(C) Bharati
(D) Himsagar

Ans. (D)
- The Indian Antarctic Program is a multi-disciplinary, multi-institutional program under the control of the National Centre for Antarctic and Ocean Research, Ministry of Earth Sciences.
- Dakshin Gangotri, Maitri and Bharati are research stations established under Indian Antarctic Program.

49. Which phenomenon of optics is used in optical fibre communication?
(A) Diffraction
(B) Reflection
(C) Total internal reflection
(D) Interference

Ans. (C)
Total internal reflection is a powerful tool since it can be used to confine light. One of the most common applications of total internal reflection is in fibre optics.

50. 'Red Biotechnology' is related to
(A) Marine engineering
(B) Agricultural science
(C) DNA
(D) Oil and gas engineering

Ans. (C)
Red biotechnology (Bio-pharmaceutical) is a process that utilizes organisms to improve health care and help the body to fight diseases. It is a branch of modern biotechnology which is utilized in the field of medicine.

51. A type of bond in the brick masonry in which each course consists of alternate headers and stretchers is
(A) English bond
(B) Raking bond
(C) Dutch bond
(D) Flemish bond

Ans. (D)
In Flemish bond each course consists of alternate headers and stretchers.

52. Quoins in brick masonry are
(A) bricks cut a corners in a triangular fashion
(B) half-brick with length same but width halved

(C) squint junction of walls
(D) corner junction of walls

Ans. (D)
Quoins are masonry blocks at corner of a wall.

53. If r is rise and g is going of stairs, the empirical formula used to fix rise and going is $2r + g$ and it should be between
(A) 500 mm-600 mm
(B) 550 mm-650 mm
(C) 600 mm-650 mm
(D) 650 mm-700 mm

Ans. (B)
For fixing the 'going' and 'rise' one thumb rule is considered for satisfactory result.
Going in cm + 2 × Rise in cm = 60
So most close option is (B).

54. Maximum size of coarse aggregate used as base coarse in ground floor is
(A) 12 mm
(B) 20 mm
(C) 40 mm
(D) 50 mm

Ans. (C)
Normal size of aggregate used for ground floor base coarse is 40 mm.

55. Flying shores are used to strengthen
(A) single wall
(B) two adjacent walls
(C) tall walls
(D) Any of the above

Ans. (B)
The term shoring is applied to construction of the temporary structure required to support an unsafe structure.
Flying shores are provided to support partly wall of two buildings.

56. When large openings are to be made in existing wall, the type of temporary work used is
(A) raking shore
(B) flying shore
(C) dead shore
(D) underpinning

Ans. (C)
Dead shores is used to provide vertical support to the walls and roofs, when the lower part of wall has to be removed for the purpose of providing an opening in the wall.

57. Water requirement per day per bed in a hospital is
(A) 45 litres   (B) 135 litres
(C) 270 litres   (D) 340 litres

Ans. (D)
As per Indian Standard, water required for a Hospital per day per bed is 340 litres.

58. Which one of the following is *not* a type of trap used in plumbing?
(A) *p*-type   (B) *q*-type
(C) *s*-type   (D) *z*-type

Ans. (D)
z-type traps are not used for plumbing purpose.

59. The cement to dry sand proportion recommended for plastering concrete surface is
(A) 1 : 3   (B) 1 : 6
(C) 1 : 8   (D) 1 : 10

Ans. (B)

60. Gauged cement mortar consists of
(A) cement and sand
(B) cement, surkhi and sand
(C) cement, lime and sand
(D) cement, cinder and sand

Ans. (c)
In gauged mortar lime is added to cement mortar to achieve better workability.

61. Impact value of stone for road work specified is
(A) wearing coat 30%
(B) bituminous macadam 35%
(C) water-bound macadam 40%
(D) All of the above

Ans. (D)
All the given statements about impact value are correct.

62. Which one of the following *does not* belong to endogenous trees?
(A) Teak   (B) Coconut
(C) Bamboo   (D) Cane

Ans. (A)
Teak is exogenous tree.

63. Alumina in brick earth gives the brick's
(A) strength
(B) colour
(C) plasticity
(D) resistance to shrinkage

Ans. (C)
Alumina import plasticity to the brick clay so that it can be moulded easily.

64. Pallet board is used
(A) to make frog in the brick
(B) to mount the mould
(C) for table moulding of brick
(D) None of the above

Ans. (C)
Pallet board is used for table moulding of brick.

65. When fat lime is slaked, its volume
(A) decreases to 50%
(B) remains same
(C) increases by 2 to 2.5 times
(D) increases by 4 times after slaking.

Ans. (C)
Fat lime volume increases by 2-2.5 time

66. The process of adding water to quicklime in order to convert it into hydrated lime is known as
(A) quenching   (B) hydration
(C) calcination   (D) slaking

Ans. (D)
Process of addition of water to quicklime is known as slaking.

67. Rotary kiln used in manufacturing cement rotates at a speed of
(A) 1 r.p.m.-3 r.p.m.
(B) 10 r.p.m.-12 r.p.m.
(C) 18 r.p.m.-22 r.p.m.
(D) more than 25 r.p.m.

Ans. (A)
The rotary kiln rotates at about 1-3 revolutions per minute about its longitudinal axis.

68. Fineness modulus is
(A) the ratio of fine aggregates to coarse aggregate
(B) the ratio of fine aggregates to total aggregate
(C) an index which gives the mean size of the aggregates used in a mix
(D) None of the above

Ans. (C)
Fineness modulus is a ratio or a number which tells about the grain size of aggregate.

69. Match **List-I** with **List-II** and select the correct answer using the codes given below the Lists:

List-I (Parts of exogenous tree)
(a) Cambium layer
(b) Pith
(c) Heartwood
(d) Sapwood

List-II (Character)
1. Youngest layer
2. Innermost part
3. Thin layer of fresh sap
4 Portion surrounding pith

Codes :

	a	b	c	d
(A)	1	2	3	4
(B)	3	2	4	1
(C)	4	1	3	2
(D)	1	3	2	4

Ans. (B)

70. By calcining and smelting iron ores, a crude and impure form of iron obtained is known as
(A) cast iron   (B) wrought iron
(C) steel   (D) pig iron

Ans. (D)
Pig iron is impure from to iron.

71. The compressive strength of high duty bricks should be more than
(A) 40 N/mm^2 (B) 20 N/mm^2
(C) 5 N/mm^2 (D) 3.5 N/mm^2

Ans. (A)
Heavy duty clay bricks should have minimum compressive strength of 40 N/mm^2.

72. If f is the focal length, i is the stadia hair interval and d is the distance between the optical centre of the object lens, the multiplying constant is
(A) f/i (B) $f + d$
(C) $(f/i) + d$ (D) $f + id$

Ans. (A)

Multiplying constant $= \dfrac{f}{i}$

Additive constant $= f + d$

73. In a tacheometry, if intercept taken on a vertically held staff is inclined at q to horizontal, the horizontal distance is
(A) $ks + c$
(B) $ks \cos q + c \cos q$
(C) $ks \cos 2q + c \cos q$
(D) $ks \sin 2q + c \sin q$

Ans. (C)
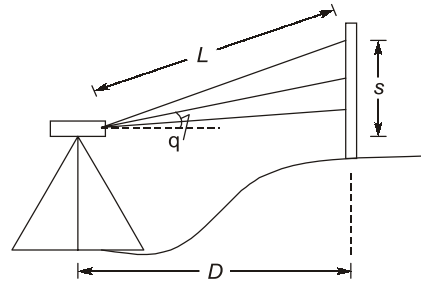
$l = ks \cos q + c$
$D = l \cos q$
$D = ks \cos^2 q + c \cos q$

Option given is wrong, it should be $\cos^2 q$ instead of $\cos 2q$.

74. In external focussing telescope with an anallatic lens, for tacheometric survey, the additive constant is
(A) zero   (B) 0.1 m
(C) 0.3 m   (D) 0.5 m

Ans. (A)
For anallatic lens
$$f + d = 0 = \text{additive constant}$$

75. In a sag curve, a minimum of stoppage distance is determined with assumptions of headlight _____ and beam tilted at an upward angle of_____.
(A) 1.0 m and 2°   (B) 0.75 m and 2°
(C) 1.0 m and 1°   (D) 0.75 m and 1°

Ans. (D)
For calculation of minimum stoppage distance in a sag curve value of headlight height = 0.75 m and beam angle is taken as 1°.

76. Match **List-I** with **List-II** and select the correct answer using the codes given below the Lists :

List-I (Types of benchmarks)
(a) GTS benchmark
(b) Permanent benchmark
(c) Arbitrary benchmark
(d) Temporary benchmark

List-II (Fixed by)
1. A survey team at the end of day work
2. The Survey of India
3. State PWD
4. A survey team in the beginning of a project

Codes :

(A) a b c d
    3 2 4 1
(B) a b c d
    3 2 1 4
(C) a b c d
    2 3 1 4
(D) a b c d
    2 3 4 1

Ans. (D)

77. If coordinates of stations *a, b, c* and *d* are $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ and (x_4, y_4) respectively the area of *abcd* is

(A) $a = 0.5\,[y_1\,(x_4 - x_2) + y_2\,(x_1 - x_3) + y_3\,(x_2 - x_4) + y_4\,(x_3 - x_1)]$

(B) $a = 0.5\,[(y_1\,(x_1 - x_2) + y_2\,(x_2 - x_3) + y_3\,(x_3 - x_4) + y_4\,(x_4 - x_1)]$

(C) $a = 0.5\,[y_1\,(x_2 - x_3) + y_2\,(x_3 - x_4) + y_3\,(x_4 - x_1) + y_4\,(x_3 - x_2)]$

(D) None of the above

Ans. (A)
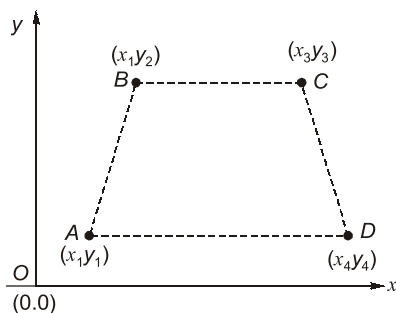
Area bounded by *abcd* is given as

$$A = \frac{1}{2}\,[y_1(x_4 - x_2) + y_2(x_1 - x_3) + y_3(x_2 - x_4) + y_4\,(x_3 - x_1)]$$

78. Spire test is to check which of the following permanent adjustments of theodolite?
(A) Plate level axis is perpendicular to vertical axis
(B) Horizontal axis is perpendicular to vertical axis
(C) The line of sight coincides with the optical axis of the telescope
(D) The axis of altitude level is parallel to the line of sight

Ans. (B)
Spire test is done to check whether horizontal axis is perpendicular to vertical axis or not.

79. A theodolite is considered to be in proper condition, if
(A) the axis of the plate is perpendicular to the vertical axis
(B) the trunnion axis is perpendicular to the vertical axis
(C) the axis of the altitude level is parallel to the line of collimation
(D) All of the above

Ans. (D)
All the above statements are correct.

80. Pick up the correct feature of accidental error in surveying.
(A) Positive and negative errors will occur with equal frequency
(B) Small errors occur more frequently
(C) Large errors do not occur
(D) All of the above

Ans. (D)
All the given points about accidental error are correct.

81. The reading taken from an instrument station on a bench-mark of 100.00 RL is 1.2 and the reading taken on next station is 1.70. Then RL of next station is

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Total Marks : 100 | Total Questions : 50 Q | Time Duration : 1 hour | Per Question : 2 marks | Negative Marking : 0.66 marks

Option 1 — TECHNICAL BASED PAPER : SYLLABUS

CIVIL		MECHANICAL		ELECTRICAL		ELECTRONICS		COMPUTER SCIENCE	
SOM	: 8Q	Thermodynamics	: 6Q	Networks	: 8Q	Networks	: 8Q	TOC	: 8Q
RCC	: 8Q	HMT	: 6Q	Control Systems	: 8Q	Control Systems	: 8Q	Algorithm	: 8Q
Soil Mechanics	: 8Q	FM	: 6Q	Electrical Machines	: 8Q	EDC	: 6Q	Operating Systems	: 8Q
Environmental	: 8Q	Production	: 10Q	Power Systems	: 8Q	Analog Electronics	: 8Q	DBMS	: 8Q
FM	: 8Q	Industrial	: 6Q	Measurements	: 6Q	Digital Electronics	: 6Q	Computer Networks	: 6Q
Highway	: 5Q	SOM	: 8Q	Analog Electronics	: 6Q	Communications	: 8Q	Digital Electronics	: 6Q
Survey	: 5Q	TOM	: 8Q	Digital Electronics	: 6Q	Signal & Systems	: 6Q	Compiler Designs	: 6Q

Option 2 — APTITUDE BASED PAPER : SYLLABUS

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(A) 98.8 m   (B) 98.30 m

(C) 99.50 m   (D) 100.50 m

Ans. (C)

RL of Bench mark = 100 m

Back sight reading = 1.2 m

∴   Height of instrument

          = 100 + 1.2 = 101.2 m

RL of next station

          = HI – fore sight reading

          = 102.2 – 1.7

          = 99.5

82. An imaginary line joining the point of intersection of the crosshairs of the diaphragm and the optical centre of the object glass is known as

(A) axis of telescope

(B) axis of level tube

(C) line of collimation

(D) horizontal axis

Ans. (C)

Line of collimation: Line joining the intersection of the cross-hairs to the optical centre of the objective and its continuation.

83. The minor instrument used not only to take horizontal sights but also inclined sights are known as

(A) clinometer   (B) sextant

(C) pantograph   (D) planimeter

Ans. (A)

Clinometer is an instrument used for measuring angles of slope.

84. Which one is *not* the effect of the presence of iron oxide in water?

(A) Causes red colour

(B) Increases corrosiveness

(C) Increases hardness

(D) Causes toxic effect

Ans. (D)

The presence of iron oxide in water does not cause any toxic effect.

85. Colour of water is expressed in number of a

(A) pO value

(B) silica scale

(C) platinum-cobalt scale

(D) None of the above

Ans. (C)

Colour of water is expressed as platinum cobalt scale.

86. The maximum permissible total solid content in water for domestic purposes should not exceed

(A) 400 p.p.m.   (B) 500 p.p.ra.

(C) 600 p.p.m.   (D) 800 p.p.m.

Ans. (B)

As per Indian Standard for drinking water specification IS 10500 : 1991, maximum permissible total solid content in water for domestic purpose should not exceed 500 p.p.m.

87. Match **List-I** with **List-II** and select the correct answer using the codes given below the Lists :

    List-I (Type of impurity)

(a) Bulky floating and suspended matter

(b) Oil and grease

(c) Suspended solids

(d) Colloidal and dissolved organic matter

    List-II (Process used for removal)

1. Floatation tanks

2. Racks and screens

3. Biological growth (slimes)

4. Chemical flocculation

Codes :

	a	b	c	d
(A)	1	2	3	4
(B)	1	2	4	3
(C)	2	3	1	4
(D)	2	1	4	3

Ans. (D)

88. To serve as mains laid on bridges, ideally suited pipes are

(A) cast iron pipes

(B) wrought iron pipes

(C) steel pipes

(D) cement concrete pipes

Ans. (C)

Welded steel pipe are most suitable for mains laid on bridges.

89. Which one of the following is **not** a formula to find headloss due to friction in flow through pipes?
(A) Darcy-Weisbach formula
(B) Hazen-Williams formula
(C) Lea formula
(D) Manning's formula

Ans. (C)
Lea formula is empirical relationship for calculation for economical diameter D of pipe in metres for a discharge Q to be pumped in m^3/s

$$D = 1.22\sqrt{Q}$$

90. Drain valves/scour valves in a water distribution system are provided at
(A) high-end points
(B) low-end points
(C) regular intervals in a pipeline
(D) All of the above

Ans. (B)
Drain valves/scour valves in water distribution system are provided at low-end points.

91. The dose of copper sulphate in water treatment varies from
(A) 0.3 p.p.m. to 0.6 p.p.m.
(B) 1 p.p.m. to 1.5 p.p.m.
(C) 2 p.p.m. to 2.5 p.p.m.
(D) 3 p.p.m. to 4 p.p.m.

Ans. (A)

92. A fluoride concentration of_____ in water is beneficial for the prevention of dental caries in children.
(A) 0.1 p.p.m. to 0.6 p.p.m.
(B) 0.7 p.p.m. to 1.2 p.p.m.
(C) 1.4 p.p.m. to 2.0 p.p.m.
(D) 2.5 p.p.m. to 3.0 p.p.m.

Ans. (B)
The fluoride concentration of water should be within range of 1 to 1.5 p.p.m.
So most near option is (b).

93. The most commonly used sewer under culvert is
(A) circular sewer
(B) semi-elliptic sewer

(C) egg-shaped sewer
(D) horseshoe-type sewer

Ans. (A)
Most commonly used sewer under culvert is circular sewer.

94. The disinfection efficiency of chlorine in water treatment
(A) is not dependent on pH value
(B) is increased by increased pH value
(C) remains constant at all pH value
(D) is reduced by increased pH value

Ans. (D)
The disinfection efficiency of chlorine in water treatment is reduced by increase in pH value.

95. **List-I** contains some properties of water/wastewater and **List-II** contains some tests on water/wastewater. Match the property with corresponding test and select the correct answer using the codes given below the Lists :
List-I
(a) Suspended solids concentration
(b) Metabolism of biodegradable organics
(c) Bacterial concentration
(d) Coagulant dose
List-II
1. BOD
2. MPN
3. Jar
4. Turbidity
Codes:

	a	b	c	d
(A)	2	1	4	3
(B)	4	1	2	3
(C)	2	4	1	3
(D)	4	2	1	3

Ans. (B)

96. The potable water is prepared from turbid surface water by adopting which of the following treatment sequences?
(A) Turbid surface water, coagulation, flocculation, sedimentation, filtration, disinfection, storage and supply

(B) Turbid surface water, disinfection, flocculation, sedimentation, filtration, coagulation, storage and supply

(C) Turbid surface water, filtration, sedimentation, disinfection, flocculation, coagulation, storage and supply

(D) Turbid surface water, sedimentation, flocculation, coagulation, disinfection, filtration, storage and supply

Ans. (A)
For turbid surface water, coagulation and flocculation followed by sedimentation is essential sedimentation is followed by filteration and disinfection.

97. Match **List-I** with **List-II** and select the correct answer using the codes given below the Lists:
List-I
(a) Thickening sludge by chemical oxidation
(b) Stabilization of sludge by heat or chemical treatment
(c) Conditioning of sludge
(d) Reduction of sludge by floatation or gravity
List-II
1. Decrease in volume
2. Separation of water
3. Digestion of sludge
4. Separation of water
Codes:
(A) a b c d
    4 3 1 2
(B) a b c d
    3 2 4 1
(C) a b c d
    4 3 2 1
(D) a b c d
    2 1 3 4

Ans. (C)

98. The BOD removal efficiency in percentage, during primary treatment, under normal conditions is about
(A) 65% (B) 85%
(C) 30% (D) zero

Ans. (C)
Approximately 25 to 50% of incoming biochemical oxygen demand is reduced during primary treatment.

99. Bulking sludge refers to having
(A) $f/m < 0.3/d$
(B) $0.3/d < f/m < 0.6/d$
(C) $f/m =$ zero
(D) $f/m > 0.6/d$

Ans. (A)
Bulking of sludge is usually characterised by $f/m < 0.3/d$.

100. SO_2 and CO adversely affect
(A) oxygen carrying capacity of blood and functioning of lungs respectively
(B) functioning of the respiratory system and brain respectively
(C) functioning of the respiratory system and oxygen carrying capacity of blood respectively
(D) functioning of air passages and chest respectively

Ans. (C)
SO_2 affect respiratory system including difficulty in breathing and increased symptoms of asthma. CO affect oxygen carrying capacity of blood.

101. A projectile is fired with initial velocity u at an angle 55° to horizontal. Then second projectile was fired with the same velocity but at an angle 35° to horizontal. Then the ratio of horizontal projection of first one to second one is
(A) more than 1
(B) equal to 1
(C) less than 1
(D) May be anything depending upon the value of u

Ans. (B)
Horizontal range of projectile is given as,
$$R = \left(\frac{V_0^2}{g}\right)\sin 2\theta$$
For $\theta = 55°$
$$R = \left(\frac{V_0^2}{g}\right)\sin(2 \times 55°)$$

$$= 0.94\frac{V_0^2}{g}$$

For θ = 35°

$$R = \left(\frac{V_0^2}{g}\right)\sin(2 \times 35°)$$

$$= 0.94\frac{V_0^2}{g}$$

∴ Ratio of horizontal projection = 1

Also, in projectile motion, horizontal range for θ and (90 – θ) is same.

102. If a roller is to be pulled over a curb, the least force q required is
   (A) vertical
   (B) horizontal
   (C) 45° to the reaction
   (D) 90° to the reaction

Ans. (D)

103. The angles between the two forces to make their resultant a minimum and a maximum are respectively
   (A) 180° and 0°   (B) 90° and 0°
   (C) 180° and 90°   (D) 0° and 180°

Ans. (A)
   For minimum resultant force should be in opposite direction
   $$\theta = 180°$$
   For maximum resultant force should be in same direction
   ∴ $$\theta = 0°$$

104. Which one of the following is fundamental law of forces?
   (A) Triangle law
   (B) Polygonal law
   (C) Parallelogram law
   (D) Lami's theorem

Ans. (C)

105. Free-body diagram means
   (A) the diagram drawn with free hand
   (B) the diagram of a body with applied forces
   (C) the diagram of a body with applied forces, self-weight and reactions
   (D) the diagram of a freely suspended body

Ans. (C)
   Free-body diagram means the diagram of body with applied forces, self-weight and reactions.

106. 0.2 percent proof stress means
   (A) stress corresponding to 0.2 percent strain
   (B) 0.2 percent of ultimate stress
   (C) stress at which if unloading is made, there will be 0.2 percent permanent set
   (D) None of the above

Ans. (C)
   0.2 percent proof stress means stress at which if unloading is made, there will be 0.2 percent permanent set.

107. In case of steel, the strain at yield point is
   (A) 0.0125%   (B) 0.125%
   (C) 1.25%   (D) 12.50%

Ans. (B)

108. In case of brittle materials, the ratio of ultimate compressive stress to ultimate tensile stress is
   (A) equal to 1
   (B) more than 1
   (C) less than 1
   (D) May be anything. No definite relation exists

Ans. (B)
   In case of brittle material like concrete the compressive stress is more than its tensile stress so its ratio will be more than one.

109. A bar of brass is enclosed in a steel tube and is rigidly fastened at both the ends. If the coefficient of thermal expansion of brass is more than that of steel, when temperature rises, the nature of stresses developed are
   (A) tensile in steel tube and compressive in brass bar
   (B) compressive in steel tube and tensile in brass bar
   (C) tensile in both steel tube and brass bar
   (D) compressive in both steel tube and brass bar

Ans. (A)

110. The relationship among modulus of elasticity e, bulk modulus k and Poisson's ratio m is
(A) $e = 3k(1 + 2m)$ (B) $e = 3k(1 - 2m)$
(C) $e = 2k(1 + m)$ (D) $e = 2k(1 - 2m)$

Ans. (B)

111. A portion of beam between two sections is said to be in pure bending, when there is
(A) constant bending moment and constant shear force
(B) constant bending moment and zero shear force
(C) zero bending moment and constant shear force
(D) zero bending moment and zero shear force

Ans. (B)

112. Maximum shear stress in a beam of circular section is_____ times the average stress.
(A) 1.25   (B) 1.33
(C) 1.5   (D) 1.67

Ans. (B)

113. A cantilever carries a uniformly distributed load from fixed end to the mid-span in the first case and a UDL of same intensity from mid-span to the free end in the second case. The ratio of maximum deflections in the two cases is

(A) $\dfrac{1}{3}$ (B) $\dfrac{3}{21}$

(C) $\dfrac{5}{24}$ (d) $\dfrac{7}{41}$

Ans. (D)
Case-1
As per given condition
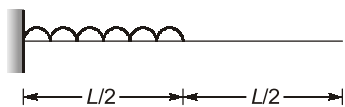
The maximum deflection in this case

$$= \frac{w\left(\frac{L}{2}\right)^4}{8EI} + \frac{w\left(\frac{L}{2}\right)^3}{6EI} \times \frac{L}{2}$$

$$= \frac{7}{384}\frac{wL^4}{EI}$$
Now consider case 2
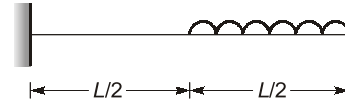
The maximum deflection in this case

$$= \frac{wL^4}{8EI} - \frac{w\left(\frac{L}{2}\right)^4}{8EI} - \frac{w\left(\frac{L}{2}\right)^3}{6EI} \times \frac{L}{2}$$

$$= \frac{41}{384}\frac{wL^4}{EI}$$

∴ Ratio of maximum deflection in case 1 and case 2

$$= \frac{\dfrac{7}{384}\dfrac{wL^4}{EI}}{\dfrac{41}{384}\dfrac{wL^4}{EI}} = \frac{7}{41}$$

114. Kern of rectangular columns is having_____ shape.
(A) rectangular   (B) square
(C) diamond   (D) triangular

Ans. (C)
The shape of kern in case of rectangular column is rhombus which is generally considered as diamond shape.

115. In the analysis of thin cylinders, assumptions made are
(i) radial stress is neglected
(ii) the hoop and longitudinal stress distribution across section is uniform
Which statement/statements is/are correct?
(A) Both (i) and (ii) are true
(B) (i) is true and (ii) is false
(C) (i) is false and (ii) is true
(D) Both (i) and (ii) are false

Ans. (A)

116. In an electrical strain gauge, the quantity measured to determine strain is

(A) current   (B) voltage

(C) resistance   (D) None of the above

Ans. (C)

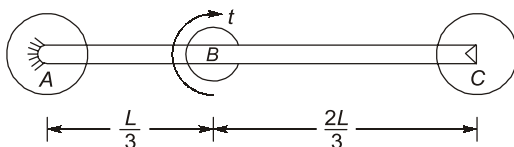117. In the above case, the direction of maximum principal plane is

(A) at $\dfrac{1}{2} \tan^{-1} \dfrac{3}{4}$ to the x-direction

(B) at $\dfrac{1}{2} \tan^{-1} \dfrac{3}{4}$ to the y-direction

(C) at 30° to the x-direction

(D) at 30° to the y-direction

Ans. (*)

Insufficient data.

118. A bar AC shown in the figure given below is fixed at both ends and is subjected to a torque t at

B where $AB = \dfrac{1}{3}$. Then torque at end A is

(A) $\dfrac{t}{3}$ (B) $\dfrac{t}{2}$

(C) $\dfrac{2t}{3}$ (D) t

Ans. (C)

$$T_A = \dfrac{t\left(\dfrac{2L}{3}\right)}{\dfrac{L}{3}+\dfrac{2L}{3}} = \dfrac{2}{3}t$$

119. A is a shaft of diameter d and B is a shaft of diameter $2d$. The ratio of polar modulus of section B to section A is

(A) 2   (B) 6

(C) 8   (D) 16

Ans. (C)

Polar modulus of section = $\dfrac{\pi}{16}D^3$

$$\dfrac{\text{Polar mouduls of B}}{\text{Polar modulus of A}} = \dfrac{D_B^3}{D_A^3} = \dfrac{(2d)^3}{d^3} = 8$$

120. In finding Reynolds number, the characteristic length of circular pipe is taken as

(A) d (B) $2d$

(C) $5d$ (D) $10d$

Ans. (A)

121. In case of turbulent flow, the loss of pressure head is proportional to vn where v is mean velocity and n is from

(A) 1.0 to 1.5   (B) 1.75 to 2.0

(C) 2.25 to 2.5   (D) 2.75 to 3.0

Ans. (B)

122. If the Froude number in open channel flow is less than 1.0, the flow is known as

(A) subcritical!

(B) critical

(C) supercritical

(D) None of the above

Ans. (A)

123. The most efficient theoretical section to get maximum discharge for a given cross-section is

(A) triangular   (B) rectangular

(C) trapezoidal   (D) circular

Ans. (D)

124. In Euler's equation

(A) no force is neglected

(B) only force of compressibility is neglected

(C) both force of compressibility and force of turbulence are neglected

(D) forces of compressibility, turbulence and velocity are neglected

Ans. (D)

In Euler's equation of motion following forces are neglected

(i)   Force due to compressibility

(ii) Force due to turbulence

(iii) Force due to viscosity

125. In Navier-Stroke equation

(A) no force is neglected

(B) only force of compressibility is neglected

(C) both force of compressibility and force of turbulence are neglected

(D) forces of compressibility, turbulence and velocity are neglected

Ans. (C)

126. The term *z* in total energy expression

$$\frac{p}{\rho g} + \frac{v^2}{2g} + z$$

is

(A) potential energy

(B) pressure energy

(C) potential energy per unit weight

(D) None of the above

Ans. (C)

127. Bernoulli equation finds its application in

(A) Pitot tube   (B) venturi meter

(C) orifice meter   (D) All of the above

Ans. (D)

128. Critical path lies along the activities having total float

(A) positive   (B) negative

(C) zero   (D) same

Ans. (C)

129. Various activities of a project are shown on bar charts by

(A) vertical lines   (B) horizontal lines

(C) dots   (D) crosses

Ans. (B)

130. Critical path network helps an engineer

(A) to concentrate his attention on critical activities

(B) to divert the resources from non-critical advanced activities to critical activities

(C) to be cautious for avoiding any delay in the critical activities to avoid delay of the whole project

(D) All of the above

Ans. (D)

131. If TL is the latest allowable event occurrence time, total activity slack(s) is equal to

(A) Lst-est   (B) Lft-eft

(C) Tl-eft   (D) All of the above

Ans. (D)

132. For the supply of materials for concrete, form work reinforcing and placing of concrete, removal of form work and curing of concrete, the number of bar(s) required on bar chart is

(A) 1   (B) 2

(C) 3   (D) 4

Ans. (C)

133. Carbonisation of coal consists of

(A) drying and crushing the coal to a fine powder

(B) moulding the finely ground coal under pressure with or without a binding material

(C) heating the wood with a limited supply of air to temperature not less than 280°C

(D) None of the above

Ans. (C)

Carbonisation is the term used to denote the heating of coal in the absence of air.

134. If the value of *n* = 0 in the equation $pv^n = c$, then the process is called

(A) constant volume process

(B) adiabatic process

(C) constant pressure process

(D) isothermal process

Ans. (C)

$$PV^n = C$$
If $n = 0$
$$PV^0 = C$$
or $P \times 1 = C$
$$P = C$$

i.e., constant pressure process

135. The behaviour of a perfect gas, undergoing any change in the variables which control physical properties, is governed by

(A) Boyle's law   (B) Charles' law

(C) Gay-Lussac law   (D) All of the above

Ans. (D)

(A) 135 ∠63.4° V   (B) 13.5 ∠63.4° V
(C) 12.2 ∠0° V   (D) 122 ∠0° V

Ans. (B)
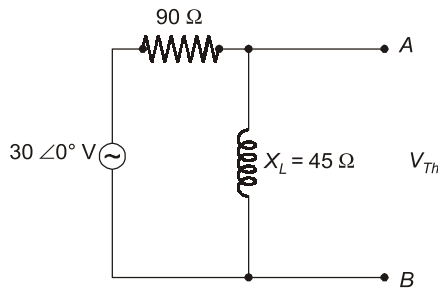
According to voltage division rule,

$$V_{Th} = 30∠0° × \frac{j45}{90 + j45}$$

$$V_{Th} = 13.416 ∠ 63.4° V$$
$$\simeq 13.45 ∠ 63.4° V$$

143. When a silicon diode is forward biased, what is V_{be} for a CE configuration?
(A) Voltage-divider bias
(B) 0.4 V
(C) 0.7 V
(D) Emitter voltage

Ans. (C)

144. The input resistance of the base of an emitter-follower is usually
(A) very low   (B) very high
(C) shorted to ground (D) open

Ans. (B)

145. When the frequency of the voltage applied to a series R-C circuit is decreased, the impedance
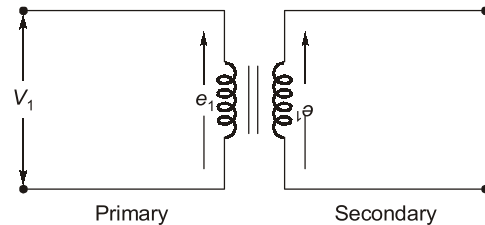(A) increases   (B) decreases
(C) remains the same (D) doubles

Ans. (A)

146. In the complex plane, the number 4 + j3 is located in the
(A) first quadrant   (B) second quadrant
(C) third quadrant   (D) fourth quadrant

Ans. (A)

147. If V_1 is the primary applied voltage and e_1 is the primary induced e.m.f., for an ideal transformer
(A) $V_1 > e_1$ (B) $V_1 = e_1$
(C) $V_1 < e_1$ (D) $V_1 = e_{1/2}$

Ans. (B)

Hence the transformer is ideal $V_1 = e_1$

148. What would happen if a power transformer designed for operation on 50 Hz (frequency) were connected to a 500 Hz (frequency) source of the same voltage?
(A) Current will be too much high
(B) Transformer may start to smoke and burn
(C) Eddy current and hysteresis loss will be excessive
(D) No effect

Ans. (C)
Power transformers are made to operate on one particular frequency, usually 50 Hz. If the frequency is too high, the inductive reactance of the primary will prevent the primary from drawing sufficient power. The hysteresis and eddy current losses will be excessive.

149. In an autotransformer, the primary and secondary are_____ coupled.
(A) only magnetically
(B) only electrically
(C) magnetically as well as electrically
(D) None of the above

Ans. (C)
In an autotransformer the primary and secondary windings are linked together both electrically and magnetically.

150. Impedance ratio of transformer is equal to
(A) square of turns ratio
(B) turns ratio
(C) 1
(D) infinite

Ans. (A)