Marks Obtained :

A

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI

WRITTEN EXAMINATION - QUESTION PAPER FOR THE POST OF
PROJECT SCIENTIFIC ASSISTANT – Mechanical

Date : 12.04.2018

Candidate's Name : _____

Application ID : _____

Signature : _____

General Instructions:

- Write your name and Application ID in the space provided.
- The Duration of the Examination is 1 hour (60 minutes).
- There are 50 objective type questions.
- Each right answer carries 2 marks and each wrong answer carries 1 negative mark.
- Question paper, answer paper and work sheets should be handed over back to the official-in-charge.
- All your answers to the multiple choice questions must be marked on the separate answer sheet provided. Do not answer anywhere else.
- The answer should be written in the capital letters - **`A', `B', `C' or `D'**.
- The calculation should be done on the rough sheets provided alongwith the question paper.
- Before you start the examination, check that your question paper is free from printing defects, faded print, missing print, repetitive defects, smeared or smudged.
- If you need to change an answer, strike out the original mark thoroughly, and then mark your alternative answer.
- Do **NOT** fold or crease your question paper.
- Mobile phones / Pager / Electronic gadgets are **NOT** allowed in the Examination Hall. However if required, calculators can be used for technical calculations.

1. The instrument used to measure external and internal diameter of shafts, thickness of parts and depth of holes, is
   A. outside micrometer B. inside micrometer
   C. depth gauge micrometer D. vernier caliper

2. The pressure less than atmospheric pressure is known as
   A. suction pressure B. vacuum pressure
   C. negative gauge pressure D. all of these

3. The metacentric heights of two floating bodies A and B are 1 m and 1.5 m respectively. Select the correct statement.
   A. The bodies A and B have equal stability
   B. The body A is more stable than body B
   C. The body B is more stable than body A
   D. The bodies A and B are unstable

4. The specific gravity of an oil whose specific weight is 7.85 kN/m^3, is
   A. 0.8 B. 1 C. 1.2 D. 1.6

5. A body of weight 120 N rests on a rough horizontal surface (μ = 0.3) and is acted upon by a force applied at an angle of 30 degree to the horizontal. The force required to just cause the body to slide over the surface is about
   A. 22.5 N B. 27 N C. 35.43 N D. 40 N

6. The humidity ratio or specific humidity is the mass of water vapour present in
   A. 1 m^3 of wet air B. 1 m^3 of dry air
   C. 1 kg of wet air D. 1 kg of dry air

7. First law of thermodynamics provides
   A. a statement that energy balance occurs when a system undergoes the change of state or the process
   B. a statement about whether the change of state or the process is at all feasible or not
   C. both A. and B.
   D. none of the above

8. Subsea Pressure compensators
   A. cannot be used in subsea hydraulic systems
   B. used in subsea dry pressure housings
   C. Applies external ambient hydrostatic pressure to interior of an assembly
   D. avoids corrosion of subsea pressure housings

9. Polymetallic nodules have metals such as_____ predominantly.
   A. Copper, Cobalt, Nickel and Manganese
   B. Gold, Aluminium and vanadium
   C. Platinum, silver, titanium and palladium
   D. Tin, lead, cadmium and Antimony

10. Allen bolts are _____.
   A. self-locking bolts
   B. designed for shock load
   C. used in aircraft application
   D. provided with hexagonal depression in head

11. For tight leakage joints, following type of thread is best suited _____.
   A. metric
   B. buttress
   C. NPT (National Pipe Threads)
   D. acme

12. A mass of 1 kg is attached to the end of a spring with stiffness 0.7 N/mm. The critical damping coefficient of this system is _____.
   A. 1.40 Ns/m
   B. 18.522 Ns/m
   C. 52.92 Ns/m
   D. 529.20 Ns/m

13. If the particles of a fluid attain such velocities that vary from point to point in magnitude and direction as well as from instant, the flow is _____.
   A. Uniform flow
   B. Turbulent flow
   C. Steady flow
   D. Laminar flow

14. The outside diameter of a hollow shaft is twice it's inside diameter. The ratio of its torque carrying capacity to that of a solid shaft of the same material and the same outside diameter is _____.
   A. 15/16
   B. 3/4
   C. 1/2
   D. 1/16

15. Electrode gets consumed in the following welding process _____.
   A. gas
   B. resistance
   C. thermit
   D. arc

16. Essential gradient of any hardened steel is _____.
   A. Carbon
   B. Cementite
   C. Martensite
   D. Pearlite

17. What is a positive displacement pump?
A. oil from suction side of the pump flows completely to the delivery side
B. volume of fluid discharged cannot return back to the suction side of the pump
C. discharges fixed volume of fluid every cycle
D. all of the above

18. What will be the discharge of oil in axial piston pump, when the angle of swash plate is zero?
A. discharge of oil is maximum
B. discharge of oil is minimum
C. there is no discharge of oil
D. none of the above

19. What is the function of hydraulic motor?

1. Hydraulic motor converts hydraulic oil under pressure into torque and angular displacement
2. Hydraulic motor converts hydraulic oil under pressure into force and linear displacement
3. Hydraulic motor converts hydraulic energy into mechanical energy
4. Hydraulic motor converts mechanical energy into hydraulic energy

A. 1 and 4
B. 1 and 3
C. 2 and 3
D. 2 and 4

20. A sprue hole is _____.
A. a casting defect
B. a hold made for riveting
C. a blind hole in jigs
D. an opening in mould for pouring molten metal

21. Coining is the operation of _____.
A. cold forging
B. hot forging
C. cold extrusion
D. piercing

22. Pressure in Pascal at a depth of 1 m below the free surface of a body of water will be equal to _____.
A. 1 Pa
B. 98.1 Pa
C. 981 Pa
D. 9810 Pa

23. The most suitable bearing for carrying very heavy loads with slow speed is _____.
A. Hydrodynamic bearing
B. Ball bearing
C. Roller bearing
D. Hydrostatic bearing

24. The fatigue strength of metal is improved by setting up compressive stresses in the surface by process known as _____.
    A. lacing
    B. shot-peening
    C. hemming
    D. slugging

25. Modulus of rigidity is defined as the ratio of _____.
    A. longitudinal stress and longitudinal strain
    B. volumetric stress and volumetric strain
    C. lateral stress and lateral strain
    D. shear stress and shear strain

26. A steel bar 200 mm in diameter is turned at a feed of 0.25 mm/rev with a depth of cut of 4 mm. The rotational speed of the workpiece is 160 rpm. The material removal rate in mm^3 /s is
    A. 160
    B. 167.6
    C. 1600
    D. 1675.5

27. Which of the following tool material has highest cutting speed?
    A. H.S.S.
    B. Carbon steel
    C.Tool steel
    D. Carbide tools

28. A ring gauge is used to measure
    A. outside diameter but not roundness
    B. roundness but not outside diameter
    C. both outside diameter and roundness
    D. only external threads

29. Inversion of mechanism is defined as:
    A. The process of obtaining by fixing different links in a kinematic chain
    B. Turning it upside down
    C. Process of obtaining by reversing the input and output motion
    D. Changing of higher pair to lower pair

30. Leaf springs are subjected to
    A. bending stress
    B. tensile stress
    C. shear stress
    D. compressive stress

31. A flywheel fitted in a steam engine has a mass of 800 kg. Its radius of gyration is 360 mm. The starting torque of engine is 580 N-m. Find the kinetic energy of flywheel after 12 seconds?
    A. 233.3 kJ
    B. 349.8 kJ
    C. 487.5 kJ
    D. None of these

32. A 20 cm-dia, 1.2 m long cylinder loses heat from its peripheral surface by convection. Surface temperature of the cylinder is constant at 100°C and the fluid temperature is constant at 20°C. The average convection heat transfer coefficient over the surface of the cylinder is 25 W/m^2 K. The heat transfer rate is

A. 376 W B. 754 W C. 1005 W D. 1507 W

33. An object of mass 5 kg falls from rest through a vertical distance of 20 m and reaches a velocity of 10 m/s. How much work is done by the push of the air on the object ($g=10\ m/s^2$)

A. 630 J B. – 630 J C. – 750 J D. 750 J

34. Ratio of moment of inertia of a circular body about its x-axis to that about y-axis is

A. 0.5 B. 1.0 C. 1.5 D. 2.0

35. A simply supported beam carries uniformly distributed load of 20 kN/m over the length of 5 m. If flexural rigidity is 30000 $kN.m^2$, what is the maximum deflection in the beam?

A. 5.4 mm B. 1.08 mm C. 6.2 mm D.8.6 mm

36. Factor of safety is the ratio of _____

A. working stress and ultimate strength
B. yield strength and endurance strength
C. ultimate strength and yield strength
D. yield strength and working stress

37. What is error of circularity?

A. Distance between maximum inscribing circle and minimum circumscribing circle measured radially
B. Distance between maximum inscribing circle and minimum zone circle measured radially
C. Distance between least square circle and minimum zone circle measured radially
D. None of the above

38. Lang lay ropes offer more resistance to _____

A. fatigue failure B. abrasive failure
C. both A and B D. none of the above

39. What does number 6 indicate in the class of wire rope 6 x 37?
A. Diameter B. Strands C. Wires D. None of the above

40. A tensile test is performed on a round bar. After fracture, it has been found that the diameter remains approximately same at fracture. The material under test was
A. Mild steel B. Cast iron C. Glass D. Copper

41. The presence of hydrogen in steel causes
A. Reduced neutron absorption cross-section B. Improved Weldability
C. Embrittlement D. Corrosion resistance

42. Ductility of a material can be defined as
A. Ability to undergo large permanent deformations in compression
B. Ability to recover its original form
C. Ability to undergo large permanent deformations in tension
D. All of the above

43. Which of the following pipes is least corrosion resistant?
A. Brass B. Mild steel C. Cast iron D. Wrought iron

44. Streamlined shapes offers resistance against air flow or water flow, the magnitude of the resistance is:
A. Least B. Maximum C. Negative D. Positive

45. Free Body diagram shows:
A. No forces are acting of the body
B. All the internal forces acting on the body
C. All the internal and external forces acting on the body
D. None of these

46. Hatching lines are drawn at ___ degree to reference line
A.30 B.45 C.60 D.90

47. The isometric axes are inclined at ___ degree to each other.
A.60 B.90 C.120 D.150

48. Syntactic foams are
    A. Composite material with polymer matrix and hollow sphere fillers
    B. Materials with more density than water
    C. single phase materials
    D. All of the above

49. A moored Buoy is a
    A. Floating Device
    B. Device which drifts with the current
    C. Both A and B
    D. None of the above

50. Port side of the ship
    A. is the right-hand side of the ship when facing forward towards the bow
    B. is the left-hand side of the ship when facing forward towards the bow
    C. is the back side of the ship facing forward towards the bow
    D. None of the above

PSA – Mechanical

Answer Key Series A	
Serial Number	*Answer*
1.	D
2.	D
3.	C
4.	A
5.	C
6.	D
7.	A
8.	C
9.	A
10.	D
11.	C
12.	C
13.	B
14.	A
15.	D
16.	C
17.	D
18.	C
19.	B
20.	D
21.	A
22.	D
23.	D
24.	B
25.	D
26.	D
27.	D
28.	A
29.	A
30.	A
31.	A
32.	D
33.	C
34.	B
35.	A
36.	D
37.	A
38.	C
39.	B
40.	B
41.	C
42.	C
43.	D
44.	A
45.	C
46.	B
47.	C
48.	A
49.	A
50.	B

Marks Obtained :

A

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI

WRITTEN EXAMINATION - QUESTION PAPER
FOR THE POST OF PROJECT SCIENTIFIC ASSISTANT – CIVIL

Date : 26.02.2018

Candidate's Name : _____

Application ID : _____

Signature : _____

General Instructions :

- Write your name and Application ID in the space provided.
- The Duration of the Examination is 1 hour (60 minutes).
- There are 50 objective type questions.
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- All your answers to the multiple choice questions must be marked on the question paper itself in the space provided.
- The calculation should be done on the rough sheets provided along with the question paper.
- Before you start the examination, check that your question paper is free from printing defects, faded print, missing print, repetitive defects, smeared or smudged.
- Read each question carefully. Put a tick corresponding to the letter of the correct answer. Do not circle, cross or underline.
- Tick **ONE** letter for **EACH** question. If it is more than one for a single question, your answer for that question will be invalid.
- If you need to change an answer, strike out the original mark thoroughly, and then mark your alternative answer.
- Do **NOT** fold or crease your question paper.
- Mobile phones / Pager / Electronic gadgets are **NOT** allowed in the Examination Hall. However if required, calculators can be used for technical calculations.

1 The argillaceous rocks have their principal constituents as
A. lime B. clay C. sand D. None of these

2 Pick up the excavation where measurements are made in square metres for payment.
i. Ordinary cuttings up to 1 m
ii. Surface dressing up to 15 cm depths
iii. Surface excavation up to 30 cm depths

A. i only B. ii only C. iii only D. Both ii and iii

3 For which of the following, will the chain surveying be well adopted one?
A. Large areas with difficult details B. Small surveys in open ground
C. Small surveys with crowded details D. Large areas with simple details

4 The property of a material by which it gets permanent deformation under a load which is not recovered after removal of load is called:
A. Elasticity B. brittleness C. Ductility D.Plasticity

5 Which of the following is a dimensionless quantity?
A. Shear Force B. Stress C. Strain D. Modulus of elasticity

6 The plan of a building is in the form of square with centre line dimensions of outer walls as 14.7 m * 14.7 m if the thickness of the wall in superstructure is 0.3 m, then its plinth area is
A. 234 m^2 B. 150 m^2 C. 216 m^2 D. 225 m^2

7 The appropriate field test to determine the insitu undrained shear strength of soft clay is
A. Plate Load test B. Static cone penetration test
C. Standard Penetration test D. Vane shear test

8 If the shear force at a section of beam under bending is equal to zero then the bending moment at the section is
A. Zero B. Maximum C. Minimum D. Minimum or maximum

9 Water Absorption of class I brick after 24 hours of immersion in water should not exceed --------- % of self weight.
A. 25 B. 18 C. 20 D.22

10 The particle size distribution curves are extremely useful for the classification of
A. Fine grained soils B. Coarse grained soils
C. Both coarse grained and fine grained soils D. Silts and clays

11 ABCD is a square. If bearing of AB is N30°E, bearing of BC is
A. S60°E B. N60°E C. E60°S D. None

12 The back sight reading on a vertically held staff at a point A on the floor along the centre line of a railway tunnel is 3.465 m and the Foresight on the inverted staff held at the roof of the tunnel just vertically above A is 1.155 m. The height of the tunnel along the centre line of floor point A is

A. 2.310 m B. 3.465 m C. 4.620 m D. 6.930 m

13 When porosity of a soil sample is 50 %, the void ratio is

A. 0 B. 0.5 C. 1 D.1.5

14 The approximate volume of cement required to prepare 100 m^3 of 1:2:4 concrete is

A. 16 m^3 B. 32 m^3 C. 25 m^3 D. 21 m^3

15 The SI unit of kinematic viscosity is _____

A. m/s B. m^2/s C. kg m/s D. kgm^2/s

16 A loose uniform sand with rounded grains has effective grain size of 0.05 cm. Co-efficient of permeability of the sand is _____. (value of constant = 100)

A. 0.25 cm/sec B. 0.5 cm/sec C. 5 cm/sec D. 1.25 cm/sec

17 The coefficient of compressibility of soil, is the ratio of _____.

A. stress to strain B. strain to stress C. stress to settlement
D. rate of loading to settlement

18 A simply supported beam which carries a uniformly distributed load has two equal overhangs. To have maximum B.M. produced in the beam least possible, the ratio of the length of the overhang to the total length of the beam is _____.

A. 0.207 B. 0.307 C.0.407 D. 0.508

19 Efflorescence in cement is caused due to an excess of _____.

A. Alumina B. Iron oxide C. Silica D. Alkalis

20 When both ends of a column are fixed, the crippling load is F. If one end of the column is made free, the value of crippling load will be changed to _____

A. F/4 B. F/2 C. F/16 D. 4F

21 A reinforced concrete structure has to be constructed along a sea coast. The minimum grade of concrete to be used as per IS 456-2000 is

A. M 15 B. M20 C. M25 D. M30

22 In slump test, each layer of concrete is tamped uniformly by

A. 12 mm dia. and 60 cm long tamping rod B. 16 mm dia. and 60 cm long tamping rod
C. 20 mm dia. and 60 cm long tamping rod D. none of these

23 In a manometer using mercury as manometric fluid and measuring the pressure of water in a conduit, the manometric rise is 0.2 m. The specific gravity of mercury is 13.55. The water pressure in m of water is

A. 2.91 B. 2.71 C. 2.51 D. none of the above

24 Which of the following systems requires satellite coverage for performing land surveys
A. Total station B. RTK system C. Theodolite D. Dumpy level

25 What are Groynes?
A. boulders wired together in cages to dissipate wave energy
B. Long walls designed to reflect wave energy
C. large boulders on the beach to absorb wave energy
D. long structure built out from shore into the sea to trap beach material

26 _____ refers to the movement of sand grains along the beach.
A. Subaqueous drift B. refractile drift C. Longshore drift D. Ebb tidal drift

27 Tides are caused by _____?
A. wind B. seismicity C. ocean currents D. gravity

28 A scale of 1 inch = 50 ft is mentioned on an old map. What is the corresponding equivalent scale?
A. 1 cm = 5 m B. 1 cm = 6 m C. 1 cm = 10 m D. 1 cm = 12 m

29 A tsunami is _____ .
A. a tidal surge caused by a storm B. a large wave caused by an undersea event
C. an earthquake which causes a large wave D. an undersea landslide

30 What is the name for the process by which ocean waves are bent as they enter shallow water?
A. Diffraction B. Refraction C. Contraction D. Reflection

31 Which of the following organization gives early warning of Tsunami?
A. IMD B. INCOIS C. NIOT D. IITM

32 The young's modulus for a perfectly rigid body is.
A. Zero B. one C. infinite D. none

33 140 coins consist of 25 paise, 50 paise and Rs.1, their values being in the ratio of 5:8:20. Find the number of 25 paise coins.
A. 40 B. 50 C. 45 D. 60

34 A person saves 20% of his income. If his income increases by 40% and he decides to save 30% of his income, by what percent has his savings increased?
A. 110 B. 10 C. 25 D. 60

35 The difference between the simple interest received from two different banks on Rs. 5000 for 2 years is Rs. 25. The difference between their interest rate is
A. 3% B. 2% C.0.5% D. 0.25%

36 A person starts from his house towards west. After walking a distance of 25 m he turned towards right and walked 10 m. He then turns left and walked 10 m, then he turned to his left again and walked 40 m. He now turned to his left and walks 5 metres. Finally he turns to his right and kept walking. In which direction is he walking now?
A. North B. South C. East D. West

37 A train 180 metres long is running at a speed of 90 kmph. How long will it take to pass a post?
A. 8.2 s B. 2 s C. 2 minutes D. 7.2 s

38 Seven persons A,B,C,D,E,F and G are standing in a straight line. D is to the right of G, C is between A and B, and only E is between F and D. There are 3 persons between G and B. Who is on the extreme left?
A. G B. A C. B D. D

39 The source of oxygen generated during photosynthesis is
A. Carbon dioxide B. water C. chlorophyll D. Mesophyll cell

40 'www' stands for _____
A. world work web B. world word web C. world wide web D. world white web

41 The loudness of sound depends upon
A. Velocity B. Amplitude C. Pitch D. Wave length

42 Complete the series
12, 14, 17, 13, 8, 14, 21, 13, 4, __
A. 6 B.8 C. 14 D. 9

43 Two vessels A and B contain milk and water in the ratio 7:3 and 4:3 respectively. Find the ratio in which the quantities be taken from the two vessels to make the resultant mixture in the ratio 2:1?
A. 7:2 B.2:7 C. 7:20 D. 20:7

44 The area of three consecutive faces of a cuboid are 12 cm^2, 20 cm^2 and 15 cm^2, then the volume of cuboid in cm^3 is _____.
A. 60 B. 30 C. 45 D. 90

45 If the numerator of a fraction is increased by 200% and the denominator of the fraction is increased by 120%, the resultant fraction is 4/11. What is the original fraction?
A. 4/15 B. 3/11 C. 5/12 D.6/11

46 If AEIOU is written as BCJMV, how XCKYB can be written in that code?
A. ADNZE B.YBLXC C. YALWC D. YELAC

47 The time period of a pendulum when taken to the moon would
A. Remain the same B. decrease C. become zero D. increase

48 The average of 100 numbers is 44. The average of these 100 numbers and 4 other new numbers is 50. The average of the four new numbers will be
A. 800 B. 200 C. 176 D.24

49 The tropic of cancer does not pass through:
A. India B. Pakistan C. Bangladesh D. Myanmar

50 The 'El Nino' phenomena which sparks climate extreme around the globe, originates in the
A. Indian Ocean B. Sea of China C. Atlantic Ocean D. Pacific Ocean

A

ANSWER KEY

PROJECT SCIENTIFIC ASSISTANT – CIVIL

1.	**B**	26.	**C**
2.	**D**	27.	**D**
3.	**B**	28.	**B**
4.	**D**	29.	**B**
5.	**C**	30.	**B**
6.	**D**	31.	**B**
7.	**D**	32.	**C**
8.	**B**	33.	**B**
9.	**C**	34.	**A**
10.	**C**	35.	**D**
11.	**A**	36.	**B**
12.	**C**	37.	**D**
13.	**C**	38.	**A**
14.	**D**	39.	**B**
15.	**B**	40.	**C**
16.	**A**	41.	**B**
17.	**B**	42.	**C**
18.	**A**	43.	**D**
19.	**D**	44.	**A**
20.	**C**	45.	**A**
21.	**D**	46.	**C**
22.	**B**	47.	**D**
23.	**C**	48.	**B**
24.	**B**	49.	**B**
25.	**D**	50.	**D**

Marks Obtained :

A

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI

WRITTEN EXAMINATION - QUESTION PAPER FOR THE POST OF
PROJECT SCIENTIFIC ASSISTANT – Life Science

Date : 10.04.2018

Candidate's Name : _____

Application ID : _____

Signature : _____

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1. Ribonuclease (RNA) has the following nitrogenous bases?

   A. A, T, G, C
   B. A, G, T, C
   C. A, U, G, C
   D. A, T, C, G

2. Who discovered the cell?

   A. Robert Hook
   B. Robert Brown
   C. Schleiden & Schwann
   D. Kolliker

3. What is the primary function of chloroplast?

   A. Food storage
   B. Photosynthesis
   C. DNA replication
   D. Transcription

4. The pH of a solution is determined by?

   A. Concentration of salt
   B. Relative concentration of Acid & Bases
   C. Electrical conductivity
   D. Dielectric constant

5. Molecules of atoms held together by _____ bond have the strongest chemical linkage

   A. Covalent
   B. Noncovalent
   C. Ionic
   D. Hydrogen

6. A Bronsted acid becomes _____ upon losing a proton

   A. Its conjugate acid
   B. Its conjugate base
   C. Its hydronium ion
   D. Highly reactive

7. Mitochondria are the contribution of _____ in the development of womb?
   A. Father
   B. Mother
   C. Both
   D. Grandparents

8. Name the organelle which decomposes hydrogen peroxide in cells

A. Lysozomes
B. Peroxisomes
C. Golgi complex
D. Endoplasmic reticulum

9. Stroma in the case of higher plants contain

A. Light independent reaction enzymes
B. Light dependent reaction enzymes
C. Ribosomes
D. Chlorophyll

10. Name the cell organelle which does not have the cell membrane

A. Ribosomes
B. Lysozomes
C. Oxyzomes
D. Metacenter

11. Citric acid cycle occurs in

A. Mitochondria
B. Cytoplasm
C. Endoplasmic Reticulum
D. Golgi bodies

12. The end product of glycolysis is pyruvate, which enters the citric acid cycle after being converted to

A. Acetic acid
B. Acetaldehyde
C. Acetyl-CoA
D. Ribose – 6 – phosphate

13. Which of the following is a land locked sea ?

A. Mediterranean sea
B. Caspian sea
C. Aral sea
D. Arabian sea

14. Deepest Ocean in the world is

A. Atlantic
B. Indian
C. Pacific
D. Arctic

15. Echo sounding is the technique used for determining

A. record earthquake waves in sea
B. Measure the amplitude of sound waves
C. Dispersion of sound in atmosphere
D. Measure the depth of the sea

16. The pacific ring of fire is associated with

A. Offshore oil well fire
B. Acidification of seawater
C. Volcanoes and earthquakes
D. Sinking islands

17. Which one of the following is not a cold ocean current

A. California
B. Kuroshio
C. Oyashio
D. Peruvian

18. Waves in the sea coast are caused due to

A. rotation of earth
B. friction of wind on the surface
C. temperature disturbances
D. none of the above

19. Ocean Acidification is caused by

A. Dumping of acidic waste in sea
B. Influx of carbon dioxide in seawater
C. Evaporation losses at sea surface
D. Increase in hydrogen sulphide in seawater

20. OCM sensors in satellites are used for measuring the

A. Temperature distribution at sea surface
B. Dissolved oxygen levels
C. Phytoplankton and algal blooms
D. Land boundaries

21. ARGO floats are deployed for measuring

A. The density of organisms in sea
B. Marker Buoys of navigation
C. Temperature, salinity profilers for climate
D. Soil texture analysis of sea bed

22. Remotely operable submersible - ROSUB 6000 was developed to

A. Retrieve sunk ships from sea bottom
B. Extraction of uranium from seawater
C. Mining of Polymetallic nodules
D. Mapping of bottom of sea surface

23. Blue revolution refers to

A. Increase in phytoplankton production
B. Increase in zooplankton production
C. Increase in carbon production
D. Increase in fish production

24. EL NINO southern ocean oscillation refers to

A. Warming of ocean surface above the SST
B. Cold current from the pacific
C. Disturbances in Antartic sea
D. Rainfall over the southern ocean

25. Ekman's spiral refers to the phenomenon of

A. Difference in temperature of sea surface and bottom
B. Circulation pattern of currents or winds near a horizontal boundary
C. Tidal action in coastal waters
D. Storm surge along shore

26. Ideal Redfield ratio for phytoplankton growth is

A. 16:1
B. 15:2
C. 12:1
D. 17:2

27. High nutrient low chlorophyll (HNLC) regions of oceans are generally characterized by

A. High nitrate
B. Less Iron
C. Less Phosphate
D. High phytoplankton

28. Indian research station in Antartica is named as

A. Dakshin Gangotri
B. Maitri
C. Bharati
D. All the above

29. How many different codons are possible

A. 5
B. 22
C. 64
D. 106

30. Which of the restriction enzymes produce blunt ends

A. SalI
B. EcoRV
C. HindIII
D. ShoI

31. In iso-electric focussing proteins are separated based on the

A. relative content of positively charged residue only
B. relative content of negatively charged residue
C. relative content of positive & negative charged residue
D. based on their size

32. $NADP^+$ is reduced to NADPH in which of the following reactions

A. Light dependent reactions
B. Photorespiration
C. Krebs cycle
D. Calvin cycle

33. Which of the following bacterial genome was the first to be sequenced

A. *S. aureus*
B. *E. coli*
C. *H. influenzae*
D. *Thermus aquaticus*

34. Which of the following mutations affect a single nucleotide

A. Non sense mutation
B. Transversion
C. Point mutation
D. Site mutation

35. Which antibiotic has a Beta-Lactam ring

A. Erythromycin
B. Streptomycin
C. Tetracycline
D. Penicillin

36. When using alcohol which concentration is considered as most effective

A. 50%
B. 95%
C. 80%
D. 70%

37. DNA fingerprinting is a suitable technique for identifying

A. Protein binding site with DNA
B. Introns within DNA
C. Individual mRNA
D. Individual tRNA

38. Bioluminescence is a phenomenon associated with

A. Chlorophyta
B. Chrysophyta
C. Phaeophyta
D. Pyrrophyta

39. Zoozanthallae are algal symbionts living with coral reefs they belong to class

A. Pyrrophyta
B. Chrysophyta
C. Chlorophyta
D. Rhodophyta

40. Astaxanthin a carotenoid is obtained from

A. Bacteria
B. Micro algae
C. Sharks
D. Blue whales

41. Agar Agar is chiefly extracted from algae belonging to

A. Chlorophyta
B. Chrysophyta
C. Phaeophyta
D. Rhodophyta

42. A bacterium which is widely used for bioleaching of iron and copper is

A. *Desulfovibrio desulfuricans*
B. *Pseudomonas aeruginosa*
C. *Thiobacillus ferroxidans*
D. *Aspergillus niger*

43. Polymerase chain reaction basically consists of

A. five steps
B. four steps
C. two steps
D. three steps

44. The concept of using microbes to clean environment is called as

A. Pasteurization
B. Biolistics
C. Fermentation
D. Bioremediation

45. Which of the following is a purine

A. Adenine
B. Cytosine
C. Thymine
D. Uracil

46. What is called as a promoter

A. A specific region of DNA to which RNA polymerase binds
B. A specific region of DNA to which a catabolic repressor binds
C. A specific region of DNA to which a restriction enzyme binds.
D. None of the above

47. Transcription factors are

A. Promoters
B. Initiators
C. Proteins which bind to DNA for regulation of transcription
D. RNA which binds to DNA for regulation of transcription

48. Which product is formed as a result of photosynthesis

A. Oxygen
B. Water
C. Carbon dioxide
D. Both A and C

49. Which of the following bacteria grows in acidic pH

A. *Salmonella* sp.
B. *Lactobacillus* sp.
C. *Shigella* sp.
D. *Vibrio cholerae*

50. Main function of an enzyme is

A. Increase the activation energy
B. Decrease the activation energy
C. maintain an constant energy
D. None of the above

18

ANSWER KEY Post: **Project Scientific Assistant (L.S.)** Date:10.04.2018

A

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer	Q.No.	Answer	Q.No.	Answer
01	**C**	11	**A**	21	**C**	31	**C**	41	**D**
02	**A**	12	**C**	22	**C**	32	**A**	42	**C**
03	**B**	13	**C**	23	**D**	33	**C**	43	**D**
04	**B**	14	**C**	24	**A**	34	**C**	44	**D**
05	**A**	15	**D**	25	**B**	35	**D**	45	**A**
06	**B**	16	**C**	26	**A**	36	**D**	46	**A**
07	**B**	17	**B**	27	**B**	37	**A**	47	**C**
08	**B**	18	**B**	28	**D**	38	**D**	48	**A**
09	**A**	19	**B**	29	**C**	39	**A**	49	**B**
10	**A**	20	**C**	30	**B**	40	**B**	50	**B**

Signature _____

Marks Obtained :

A

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI

WRITTEN EXAMINATION - QUESTION PAPER FOR THE POST OF
PROJECT SCIENTIFIC ASSISTANT – Computer Science

Date : 10.04.2018

Candidate's Name : _____

Application ID : _____

Signature : _____

General Instructions :

- Write your name and Application ID in the space provided.
- The Duration of the Examination is 1 hour (60 minutes).
- There are 50 objective type questions.
- Each right answer carries 2 marks and each wrong answer carries 1 negative mark.
- Question paper, answer paper and work sheets should be handed over back to the official-in-charge.
- All your answers to the multiple choice questions must be marked on the separate answer sheet provided. Do not answer anywhere else.
- The answer should be written in the capital letters - **`A', `B', `C' or `D'**.
- The calculation should be done on the rough sheets provided alongwith the question paper.
- Before you start the examination, check that your question paper is free from printing defects, faded print, missing print, repetitive defects, smeared or smudged.
- If you need to change an answer, strike out the original mark thoroughly, and then mark your alternative answer.
- Do **NOT** fold or crease your question paper.
- Mobile phones / Pager / Electronic gadgets are **NOT** allowed in the Examination Hall. However if required, calculators can be used for technical calculations.

A

Project Scientific Assistant (Computer Science)

1. The IP address 192.168.2.10 is
   A. Class A public IP address
   B. Class B public IP address
   C. Class A private IP address
   D. Class C private IP address

2. The IP address 172.217.26.174 is
   A. Class A public IP address
   B. Class B public IP address
   C. Class A private IP address
   D. Class C private IP address

3. IPv6 is a ..... bit address system.
   A. 32 B. 64 C. 128 D. 256

4. DNS stands for
   A. Doppler notation system
   B. Direct naming system
   C. Domain naming system
   D. Directory naming system

5. NAT stands for
   A. National access translation
   B. Network address tunnel
   C. Network access tunnel
   D. Network address translation

6. SSID stands for
   A. Service Set Identifier
   B. Service signal identifier
   C. Signal Service identifier
   D. Signal set identifier

7. Firewall is used to
   A. avoid fire accidents
   B. Secure the building
   C. Secure the network
   D. Secure machine & instruments

8. CryptoLocker is
   A. for safe keeping of documents
   B. Ransomeware
   C. Hardware
   D. Crypto currency

9. Port 80 is generally used by
   A. HTTP B. FTP C. SMTP D. PPTP

10. LAN stands for
    A. local area noise
    B. local area network
    C. legitimate area noise
    D. legitimate aerial noise

A

11. Data stored in RAM is permanent

A. YES B. NO C. Not Sure D. ALL

12. Data stored in ROM is permanent

A. YES B. NO C. Not Sure D. ALL

13. Hard Disk Drive is for

A. Storage of instruments B. Storage of Data

C. Storage of jewellery D. ALL

14. Processor is kept cool by

A. HDD B. FDD C. Methanol D. Heatsink

15. If the user has forgotten the login password, what would you suggest?

A. Format the system B. Reinstall the OS

C. Inform the administrator D. Try recovery tools

16. Consider there is a virus attack in the system, what would you do first as a technical assistant?

A. Run antivirus software B. Isolate the system from network if it is in LAN

C. Remove USB devices attached D. Connect a USB drive to install virus detectors

17. VGA and HDMI ports are used for connecting

A. Camera B. Monitor C. Projector D. B&C

18. How can you boot into a system, using

A. FDD, HDD B. HDD, USB, Optical Drive C. A&B D.HDD only

19. A major software you just installed corrupted the system, what would you do?

A. Delete the software folder B. Format the OS

C. Edit registry D. Try System restore

20. It is ok to install pirated software's on the work systems in office

A. YES B. NO C. Not sure D. None

A

21. ..... must contain a unique value for each row of data.

A. Name B. Roll C. IP address D. Primary key

22. Which normal form is considered adequate for relational database design?

A. 2NF B. 3NF C. 4NF D. BCNF

23. The concept of locking can be used to solve the problem of

A. lost update B. uncommitted dependency C. inconsistent data D. all the above

24. In a train reservation System, the entities are date, train number, place of departure, destination, seat number, and class .which is the primary key

A. Train number B. Train number + destination

C. Train number+ Date D. None of the above

25. Inner Join returns

A. records that have matching values in both tables

B. records that have matching values in one table

C. records that have not matching values in both tables

D. None

26. Left outer Join returns

A. all records from the left table, and the matched records from the right table

B. all records from the left table, and the non matched records from the right table

C. all records from the left table, and the all records from the right table

D. None

27. What does SSRS stand for?

A. Single System right select B. Single Select right system

C. SQL Server reporting services D. None of the above

28. What does SSAS stand for?

A. Server System Analytical services B. SQL Server Analysis Services

C. SQL Server Analytical services D. None of the above

29. What is a connection string?

A. Facebook connections pattern illustrator B. Instagram connections pattern illustrator

C. It specifies information about a data source and the means of connecting to it.

D. None

A

30. Crystal reports is a

A. Business intelligence application B. Supports PostgreSQL, Sybase, IBM DB2, My SQL

C. A&B D. None

31. IBM Notes provides business collaboration functions like

A. email B. calendar C. instant messaging D. All the above

32. Microsoft Exchange Server offers functions like

A. email B. calendar C. A&B D. None

33. SMTP, POP3 and IMAP port numbers are

A. 25,110,143 B. 26,110,143 C. 27,110,143 D. A&B

34. The user received a mail from unknown source with attachments and links, what would you suggest?

A. click on the links and open the attachments B. Report to the administrator

C. Forward the email to friends D. None

35. Is it recommended to transfer huge files and documents greater than 10MB through emails?

A. YES B.NO C. Not sure D. None

36. Windows and Ubuntu are

A. Operating Systems B . Hardware C. Malware D. Hindware

37. cmd is to windows, ... is to ubuntu

A. amd B. umd C. terminal D. None

38. ipconfig is to windows, ... is to unix

A. uconfig B. ifconfig C. pconfig D. None

39. There exists a user 'test' on a unix machine, the command 'passwd test' is used for

A. Display the password B. set the password

C. Delete the password D. None

40. command 'mstsc' is used for

A. message transaction B. remote desktop connection

C. modular scope transfer D. None

A

41. You have pinged a system in your local network using an IP number, the result is "request timed out", what does it infer?

A. System is down B. IP available for issue C. network issues D. All the above

42. You have pinged google.com , the result is "Ping request could not find host google.com.", what does it infer?

A. Google Server is down B. network configuration issues in the local system

C. Google server is busy D. All the above

43. The <td> tag defines a standard ..... in an HTML table.

A. table B. column C. row D. cell

44. The <a> tag defines ....., which is used to ..... from one page to another.

A. hyperlink, link B. font, differentiate C. applet, load D. area, span

45. The comment tag <!-- .....--> is used to insert comments in the source code. Comments are not displayed in the

A. Text editor B. Browser C. A&B D.None

46. What is the port used for accessing wired Ethernet network connection?

A. RJ 11 B. RJ12 C.RJ45 D.None

47. Fedora, Suse, Deepin, Debain are names of

A. Databases B. Operating systems C.Antivirus softwares D.None

48. PHP is a

A. Client side scripting language B. Server side scripting language

C. Text styling Script D. None

49. "SELECT * FROM table1;" query lists the entire rows and columns in table1.

A. YES B. NO C. Not sure D.None

50. "SELECT count(*) FROM Customers" displays the output

A. number of columns in Customers table

B. number of rows/records in Customers table

C. Not sure

D. Error

Set A

1. D	11. B	21. D	31. D	41. D
2. B	12. A	22. B	32. C	42. B
3. C	13. B	23. D	33. D	43. D
4. C	14. D	24. C	34. B	44. A
5. D	15. C	25. A	35. B	45. B
6. A	16. B	26. A	36. A	46. C
7. C	17. D	27. C	37. C	47. B
8. B	18. C	28. B	38. B	48. B
9. A	19. D	29. C	39. B	49. A
10.B	20. B	30. C	40. B	50. B

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI

WRITTEN EXAMINATION - QUESTION PAPER

FOR THE POST OF PROJECT SCIENTIFIC ASSISTANT – CHEMCIAL SCIENCE

Date : 27.02.2018

1. Which enzyme converts glucose into ethyl alcohol ?
a. Invertase
b. Maltase
c. Zymase
d. Diastase

2. Soap is prepared by boiling caustic soda with which of the following ?
a. Alcohol
b. Kerosene
c. Glycerine
d. Fats

3. The natural sources of hydrocarbon is
a. Crude oil
b. Carbohydrates
c. Biomass
d. None of these

4. Which among the following is the pure matter ?
a. Carbon-di-oxide
b. Brass
c. Air
d. Iron

5.The system that uses the carbohydrate that decide periodic dating of materials of pre-hitoric
a. Radium dating
b. Uranium dating
c. Carbon dating
d. Deutrium dating

6. What are the metallic constituents of hard water ?
a. Magnesium, Calcium and Tin
b. Iron, Tin and Calcium
c. Calcium, Magnesium and Iron
d. Magnesium, Tin and Iron

7. Wax is the chemical mixture of
a. Aliphatic hydrocarbon
b. Cyclic hydrocarbon
c. Aromatic hydrocarbon
d. Aliphatic and aromatic hydrocarbon

8.Which among the following stage is suitable indicator when solution of sodium carbonate is

mixed with sulphuric acid ?
a. Methyl organge
b. Methyl Red
c. Methylene blue
d. Phenolpthalin

9.Baryllium sulphate is less soluble in water is due to
a. Ionic bond
b. Low inflammable energy
c. High inflammable energy
d. Low energy of dissociation

10. The reaction between methane and chlorine in diffused sunlight is
a. Oxidation
b. Reduction
c. Polymerization
d. Substitution

11. Bleaching action of chlorine is by
a. Oxidation
b. Reduction
c. Decomposition
d. Hydrolysis

12. The number of d-electrons in Fe^{2+} (Z = 26) is not equal to that of
a. p-electrons in Ne(Z = 10)
b. *s*-electrons in Mg (Z =12)
c. *d*.electrons in Fe (Z = 26)
d. *p*-electrons in Cl (Z = 17)

13. The law which states that the amount of gas dissolved in a liquid is proportional to its partial pressure is
a. Dalton's Law
b. Gay Lussac's law
c. Henry's Law
d. Raoult's Law

14. The mass of P_4O_{10} that will be obtained from the reaction of 1.33 gram of P_4 and 5.07 of oxygen is
a. 2.05 gram
b. 3.05 gram
c. 4.05 gram
d. 5.05 gram

15. The number of water molecules present in a drop of water (volume 0.0018 ml) at room temperature is
a. 1.568×10^3
b. 6.023×10^{19}
c. 4.84×10^{17}
d. 6.023×10^{23}

16. The following are the half lives of four active isotopes. Which one of the following is the most dangerous to handle?
a. 3 billion years
b. 100 years
c.0.01 minute
d. 13 days

17. The ionization energy of hydrogen atom in the ground state is x KJ. The energy required for an electron to jump from 2^{nd} orbit to 3^{rd} orbit is
a. 5x/36
b.5x
c.7.2x
d.x/6

18. The most extensive, commercially useful source of thorium as monazite sand occurs in India at
a. Orissa coast
b. Travancore coast
c. West Bengal coast
d. Gujarat Coast

19. The half life period of an isotope is 2 hours. After 6 hours what fraction of the initial quantity of the isotope will be left behind?
a.1/6
b.1/3
c.1/8
d.1/4

20. Which of the following compounds is not an antacid?
a. Aluminium Hydroxide
b. Cimetidine
c. Phenelzine
d. Ranitidine

21. Substances which affect the central nervous system and induce sleep are called
a. Tranquilizers
b. Antipyretics
c. Analgesics
d. None of these

22. Which one of the following compounds is added to soap to impart antiseptic properties is?
a. sodium lauryl sulphate
b. sodium dodecylbenzenesulfonate
c. rosin
d. bithional

23. $t_{1/4}$ can be taken as the time taken for the concentration of a reactant to drop to 3/4 of its initial value. If rate constant for a first order reaction is k, then $t_{1/4}$ can be written as
a. 0.01 k
b.0.29 k

c.0.69 k
d.0.75 k

24. In a first order reaction, the concentration of the reactant decreases from 0.8 M to 0.4 M in 15 minutes. The time taken for the concentration to change from 0.1 M to 0.025 M is
a. 7.5 min
b.15.0 min
c. 30.0 min
d.60.0 min

25. Butylated hydroxy toluene is used in
a. preventing oxidative rancidity of fats
b. preserving food grains
c. killing bacteria in living tissues
d. reducing stress and anxiety

26. Tincture of iodine is
a. alcoholic solution of I_2
b. solution of I_2 in aqueous KI
c. aqueous solution of I_2
d. aqueous solution of KI

27. What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to burn completely 1 litre of propane gas (C_3H_8) measured under the same conditions?
a.10 L
b.7 L
c. 6 L
d. 5 L

28. Which of the given sets of temperature and pressure will cause a gas to exhibit the greatest deviation from ideal gas behaviour ?
a. 100°C and 4 atm
b. 100°C and 2 atm
c. -100°C and 4 atm
d. 0°C and 4 atm

29. Maximum deviation from ideal gas is expected from
a. $H_2(g)$
b. $N_2(g)$
c. $CH_4(g)$
d. $NH_3(g)$

30. Which one of the following statements is NOT true about the effect of an increase in temperature on the distribution of molecular speeds in a gas ?
a. The most probable speed increases
b. The fraction of the molecules with the most probable speed increases
c. The distribution becomes broader
d. The area under the distribution curve remains the same as under the lower temperature

31.The molar solubility of $PbCl_2$ in 0.20 M Pb (NO_3) solution is:

a. 1.7×10^{-4} M
b. 9.2×10^{-3}M
c. 1.7×10^{-5} M
d.4.6×10^{-3} M

32.What is the pH of a saturated solution of Mg $(OH)_2$?

a. 3.5
b. 10.1
c.10.9
d.10.5

33. Which one of the following salts is insolubie ?

a. NH_4 Cl
b. Ca $(NO_3)_2$
c. $BaCO_3$
d. Na_2S

34. Chlorine gas is prepared commercially by:

a. electrolysis of carbon tetrachloride
b. oxidation of choride ion with F2 (g)
c. electrolysis of NaCl (aq)
d. Oxidation of chloride ion with Br_2 (aq)

35. Gammaxene, D.D.T. and bleaching powder are important compounds of

a. Chlorine
b.Nitrogen
c. Sulphur
d. Phosphorus

36. Garling with a solution of table salt is known to provide relief for a sore throat because..

a. It kills bacteria
b. It works as analgesic
c. It dehydrates water from inflammatory tissues by Osmosis
d. Placebo effect

37. Which of the following is also known as wood alcohol ?

a. Methonol
b. Ethanol
c. Proponal
d. Butanol

38. The alkali metals are called good reducing agents which implies that

a. They easily capture electrons
b. They are nor stable at room temperature
c. They easily lose electrons
d. They don't act with dilute acids

39.Which of the following is the most commonly used chemical for ripening in India ?
a. Potassium Iodide
b. Silver Iodide
c. Ammonium Nitrate
d. Calcium carbide

40. Which of the following is not a correct statement about Bitumen ?
a. It is a mixture of highly condensed polycylic aromatic hydrocarbons
b. Its soluble in Carbon disulphide
c. SARA analysis is used to determine bitumen chemistry
d. All of above are correct statements

41. "Atoms can neither be created nor destroyed". This principle was given by
a. Avogadro
b. Dalton
c. Rutherford
d. Niels Bohr

42. The aqueous solution of which among the following acids is called Vinegar ?
a. Oxalic acid
b. Citric acid
c. Acetic acid
d. Hydrochloric acid

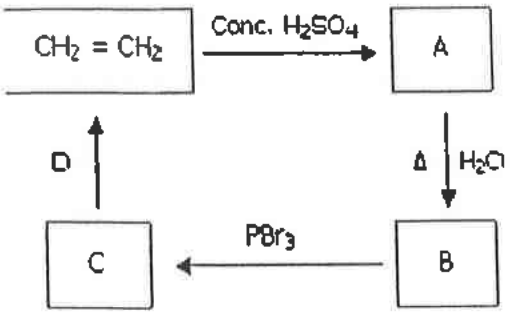
43. Calamine is an ore of which among the following ?
a. Zinc
b. Copper
c. Mercury
d. Iron

44. One mole of oxygen at 273 k and one mole of sulphur dioxide at 546 k are taken in two separate containers, then,
a. kinetic energy of O_2 > kinetic energy of SO_2
b. kinetic energy of O_2 < kinetic energy of SO_2
c. kinetic energy of both are equal
d. None of these

45. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to
a. increase in both i.e. number of ions and ionic mobility of ions.
b. increase in number of ions
c. increase in ionic mobility of ions
d. 100% ionization of electrolyte at normal dilution

46. The hydrogen electrode is dipped in a solution of pH 3 at 25°C. The potential would be (the value of 2.303 RT/F is 0.059 V)
a. 0.177 V
b. 0.087 V
c. 0.059 V
d. -0.177 V

47. Identify B and D is the following sequence of reactions.



a. Ethanol and alcoholic KOH
b. Methonol and bromethane
c. Ethyl hydrogen sulphate and alcoholic KOH
d. Ethyl hydrogen sulphate and aqueous KOH

48. n-propyl bromide on treating with alcoholic KOH produces
a. Propyne
b. Propene
c. Propane
d. Propanol

49. Petrol for aviation purpose must contain
a. straight chain hydrocarbons
b. olefinic hydrocarbons
c. aromatic hydrocarbons
d. highly branched chain hydrocarbons

50. Which of the following is an intensive property?
a. temperature
b. surface tension
c. viscosity
d. all of these

ANSWER KEY FOR PROJECT SCIENTIFIC ASSISTANT–CHEMICAL SCIENCE

Q. No.	A	B	Q. No.	A	B
1	**(c)**	**(b)**	26	**(a)**	**(b)**
2	**(d)**	**(d)**	27	**(d)**	**(d)**
3	**(a)**	**(c)**	28	**(a)**	**(c)**
4	**(d)**	**(d)**	29	**(d)**	**(d)**
5	**(c)**	**(d)**	30	**(b)**	**(d)**
6	**(c)**	**(b)**	31	**(d)**	**(c)**
7	**(a)**	**(c)**	32	**(d)**	**(c)**
8	**(a)**	**(a)**	33	**(d)**	**(b)**
9	**(c)**	**(c)**	34	**(c)**	**(c)**
10	**(d)**	**(d)**	35	**(a)**	**(a)**
11	**(c)**	**(d)**	36	**(c)**	**(b)**
12	**(d)**	**(c)**	37	**(a)**	**(c**
13	**(c)**	**(d)**	38	**(c)**	**(d)**
14	**(b)**	**(c)**	39	**(d)**	**(a)**
15	**(d)**	**(a)**	40	**(d)**	**(a)**
16	**(c)**	**(a)**	41	**(b)**	**(c)**
17	**(b)**	**(c)**	42	**(c)**	**(c)**
18	**(b)**	**(d)**	43	**(a)**	**(d)**
19	**(c)**	**(d)**	44	**(b)**	**(a)**
20	**(a)**	**(c)**	45	**(c)**	**(c)**
21	**(a)**	**(b)**	46	**(d)**	**(d)**
22	**(d)**	**(d)**	47	**(a)**	**(b)**
23	**(b)**	**(d)**	48	**(b)**	**(c)**
24	**(b)**	**(b)**	49	**(d)**	**(b)**
25	**(b)**	**(a)**	50	**(d)**	**(a)**

Marks Obtained :

B

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI

WRITTEN EXAMINATION - QUESTION PAPER FOR THE POST OF
PROJECT SCIENTIFIC ASSISTANT – ECE / E&I

Date : 11.04.2018

Candidate's Name : _____

Application ID : _____

Signature : _____

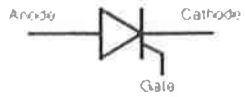
General Instructions :

- Write your name and Application ID in the space provided.
- The Duration of the Examination is 1 hour (60 minutes).
- There are 50 objective type questions.
- Each right answer carries 2 marks and each wrong answer carries 1 negative mark.
- Question paper, answer paper and work sheets should be handed over back to the official-in-charge.
- All your answers to the multiple choice questions must be marked on the separate answer sheet provided. Do not answer anywhere else.
- The answer should be written in the capital letters - **`A', `B', `C' or `D'**.
- The calculation should be done on the rough sheets provided along with the question paper.
- Before you start the examination, check that your question paper is free from printing defects, faded print, missing print, repetitive defects, smeared or smudged.
- If you need to change an answer, strike out the original mark thoroughly, and then mark your alternative answer.
- Do **NOT** fold or crease your question paper.
- Mobile phones / Pager / Electronic gadgets are **NOT** allowed in the Examination Hall. However if required, calculators can be used for technical calculations.

B

PROJECT SCIENTIFIC ASSISTANT – ECE / E&I

1. The following symbol represents-----.



A. UJT
B. MOSFET
C. SCR
D. Zener diode

2. This symbol represents. 
A. Signal ground
B. Earth (ground)
C. Chassis ground
D. None of the above

3. Megger is used to measure
A. Voltage
B. Current
C. Insulation resistance
D. None of the above

4. Which of the following command will copy the contents of location 04H to the accumulator?
A. MOV A, 04H
B. MOV A, L4
C. MOV L4,A
D. MOV 04H,A

5. What is CDMA ?
A. Computer division multiple access
B. Coded Division Multiple Access
C. Code division multiple alternate
D. None of the above

6. Strain Gauge is a?
A. Passive Sensor
B. Active Sensor
C. Temperature sensor
D. Both (A) & (C)

7. -----//------//------//-------//---- is a
A. Hydraulic signal representation
B. Electrical signal representation
C. Pneumatic signal representation
D. Process representation

8. SONAR is a device used for
A. Seabed imaging
B. Chlorophyll measurement
C. Salinity measurement
D. Water quality measurement

9. Conductivity has a unit of
A. mho per meter^2
B. mho per meter
C. ohm per meter^2
D. ohm per meter

10. Deep ocean tsunami alert system works by measuring
A. Speed of wave
B. Change in pressure
C. temperature profile
D. All the above

11. The cumulative addition of (1+1+1+1) gives
A. 1111
B. 111
C. 100
D. 1001

B

12. How would adding a 20-Ω resistor in parallel with a 100-Ω resistor change the reading on an ammeter?
    A. Increases
    B. No change
    C. Decreases

13. Which of the following is represented by the symbol X_L?
    A. impedance of a load
    B. reactance of a coil
    C. resonant frequency of a filter
    D. output level of a source

14. Material used for fuse has
    A. Low melting point and low specific resistance
    B. Low melting point and high specific resistance
    C. High melting point and low specific resistance
    D. High melting point and high specific resistance

15. Which of the following is true for a capacitor?
    A. A capacitor acts like a short to instantaneous changes in current.
    B. A capacitor's voltage cannot change instantaneously.
    C. A capacitor acts like an open to dc.
    D. All of the above

16. What is the product-over-sum result of 150 and 6800?
    A. 150 B. 146.7 C. 0.006 D. 6800

17. In a 15V zener diode, the breakdown mechanism will occur by _____.
    A. Avalanche mechanism
    B. Zener mechanism
    C. Both Zener and avalanche mechanism
    D. None of the above

18. The r.m.s. value of sinusoidal 100 V peak to peak is _____ volts.
    A. 100 /√2
    B. 50 /√2
    C. 100
    D. 75

19. JFET has main drawback of
    A. having low input impedance.
    B. having high output impedance.
    C. being noisy.
    D. Having small gain-bandwidth product.

20. EPROM contents can be erased by exposing it to
    A. Ultraviolet rays.
    B. Infrared rays.
    C. Burst of microwaves
    D. Intense heat radiations

21. Compass is used in offshore floating platforms to measure
    A. Position
    B. Direction
    C. Depth
    D. None of the above

22. GPS stands for
    A. Global positioning standard
    B. Global positioning system
    C. Gyro positioning system
    D. None of the above

B

23. LM317 is a ----
    A. Amplifier
    B. Oscillator
    C. Timer
    D. Voltage regulator

24. Which resistive component is temperature sensitive?
    A. Rheostat
    B. Thermister
    C. Potentiometer
    D. Photo conductive cell

25. A volt meter is used
    A. To measure coulombs
    B. In series with the circuits
    C. In parallel with the circuits
    D. To measure the current

26. A lead acid battery is an example of
    A. Primary battery
    B. Fuel cell
    C. Secondary battery
    D. Solar cell

27. If 2Ω resister and 4Ω resistors are connected in parallel across 12 V supply. What is the current received by the resister 4Ω.
    A. 12A
    B. 6A
    C. 8A
    D. 3A

28. If C1=4.7μF and C2=3.3 μF are series with the supply of 18Vdc. What is the voltage across C1?
    A. 3.3
    B. 6.6
    C. 7.4
    D. 9.4

29. What is a capacitor value labeled as 102?
    A. 10,000pF
    B. 1000 μF
    C. 1000 pF
    D. 10,000 μF

30. An astable multivibrator is known as
    A. Bistable multivibrator
    B. One shot multivibrator
    C. Free running multivibrator
    D. Monostable multivibrator

31. Tides in the sea are caused by
    A. Effects of the moon
    B. Effects of the sun
    C. Sun and the moon
    D. Gravitational centrifugal or centripetal forces

32. In the measurement system what term is used to specify the closeness of two or more measurement?
    A. Accuracy
    B. Error
    C. Precision
    D. Threshold

33. ASCII stands for
    A. American Serial Communication Interface
    B. Additive Signal Coupling Interface
    C. American Standard Code for Information Interchange
    D. None of the above

B

34. The software used to drive microprocessor based systems is called
    A. assembly language programs
    B. firmware
    C. BASIC interpreter instructions
    D. flowchart instructions

35. The decimal equivalent of Binary number 10101 is
    A. 21 B. 31 C. 26 D. 28

36. The voltage gain of an ideal Op-Amp is ___ _____.
    A. Infinity
    B. Very high
    C. Very low
    D. Zero

37. Increasing the number of turns of wire on the secondary of a transformer will
    A. increase the secondary current
    B. decrease the secondary current
    C. have no effect on the secondary current
    D. increase the primary current

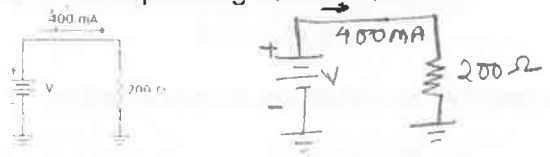
38. What is Pt100
    A. RTD sensor made of platinum material and it resistance value is 100 Ω at 0 ° C
    B. Thermocouple sensor made of platinum material and it produce 100 mV at 0 ° C
    C. RTD sensor made of platinum material and it produce 100 mV at 0 °C
    D. Thermistor sensor made of platinum material and its resistance value is 100 Ω at 0 °

39. Sinusoidal oscillators operate with ---------- feedback
    A. Positive
    B. Both positive and negative
    C. Negative
    D. None of the above

40. What is the value of pneumatic signal which is equivalent to electrical signal of 4- 20mA
    A. 0-15 psi
    B. 4 -20 psi
    C. 3- 15 psi
    D. 0-20 psi

41. What does three subcircuits does a PLL consists of
    A. phase comparator, comparator, and VCO
    B. phase comparator, bandpass filter, and VCO
    C. phase comparator, bandpass filter, and demodulator
    D. phase comparator, low-pass filter, and VCO

42. what is the power given in the circuit

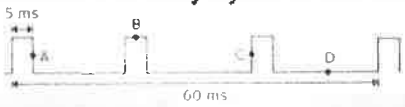


    A. 32W
    B. 80W
    C. 500W
    D. 16kW

43. The "Superposition theorem" is essentially based on the concept of
    A. duality.
    B. linearity.
    C. reciprocity.
    D. non-linearity

B

44. Calculate the duty cycle of the waveform



A. 33.3%
B. 10%
C. 25%
D. 1%

45. In a transistor .....
A. $I_C = I_E + I_B$
B. $I_B = I_C + I_E$
C. $I_E = I_C - I_B$
D. $I_E = I_C + I_B$

46. The NAND gate output will be low if the two inputs are
A. 00 B. 01 C. 10 D. 11

47. What is the color code for a 220Ω, 5% resistor?
A. Red, Red, Brown, Gold
B. Orange, Orange, Black, Gold
C. Red, Red, Black, Gold
D. Red, Red, Brown, Silver

48. What is the period of a 16 MHz sine wave?
A. 196 ns
B. 62.5 ns
C. 31.25 ns
D. 19.9 ns

49. A UJT has
A. two base leads
B. one emitter lead
C. two emitter leads and one base lead
D. one emitter lead and two base leads

50. What is the decimal value of the hexadecimal number 777?
A. 191
B. 1911
C. 19
D. 19111

B

ANSWER KEY

Post: **Project Scientific Assistant (ECE/E&I)** Date 11.04.2018

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer	Q.No	Answer	Q.No.	Answer
01	C	11	C	21	B	31	C	41	D
02	C	12	A	22	B	32	C	42	A
03	C	13	B	23	D	33	C	43	B
04	D	14	B	24	B	34	A	44	C
05	B	15	D	25	C	35	A	45	D
06	A	16	B	26	C	36	A	46	D
07	A	17	A	27	D	37	B	47	A
08	A	18	B	28	C	38	A	48	B
09	B	19	D	29	C	39	C	49	D
10	B	20	A	30	C	40	C	50	B

Marks Obtained :

A

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI

WRITTEN EXAMINATION - QUESTION PAPER FOR THE POST OF
PROJECT SCIENTIFIC ASSISTANT – Electrical

Date : 10.04.2018

Candidate's Name : _____

Application ID : _____

Signature : _____

General Instructions :

- Write your name and Application ID in the space provided.
- The Duration of the Examination is 1 hour (60 minutes).
- There are 50 objective type questions.
- Each right answer carries 2 marks and each wrong answer carries 1 negative mark.
- Question paper, answer paper and work sheets should be handed over back to the official-in-charge.
- All your answers to the multiple choice questions must be marked on the separate answer sheet provided. Do not answer anywhere else.
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PROJECT SCIENTIFIC ASSISTANT (ELECTRICAL)

A

1. Wave energy powered desalination plant in India was located at

   A. Kavaratti
   B. Vizhinjam
   C. Tuticorin
   D. Visakhapatnam

2. R.R.R.V stands for

   A. Rate of rise of residual voltage
   B. Rate of remaining residual voltage
   C. Rate of rise of re-striking voltage
   D. Rate of rise of recovery voltage

3. SF6 gas is used in circuit breakers because it is a

   A. Electro-negative gas
   B. Inert gas
   C. Conductive gas
   D. Electro-positive gas

4. The best conductor of Electricity is

   A. Copper
   B. Gold
   C. Silver
   D. Aluminum

5. Which of the following is not an insulation material?

   A. XLPE
   B. PVC
   C. Mica
   D. Graphite

6. A 40 W incandescent lamp is connected in series with a 100 W incandescent lamp across AC supply of 230 V. Which lamp will glow brighter?

   A. 100 W lamp
   B. 40 W lamp
   C. Both the lamps will glow with equal brightness
   D. The lamps will not glow at all.

7. An Isolator is designed to operate at

   A. No-load condition
   B. Fault condition
   C. Full-load condition
   D. Nominal load condition

8. Skin effect occurs when the conductor is used in

   A. DC supply
   B. AC supply
   C. Both AC and DC
   D. None of the above

9. Which of the following is the example of a symmetrical fault in a 3 phase line?

A. Single line- to- ground fault
B. Line-to- line fault
C. Double line-to -ground fault
D. Three lines-to-ground fault

10. Buchholz relay is used for the protection of

A. Dry type transformers
B. Air-cooled transformers
C. Oil immersed transformers
D. All of the above

11. In India, the major share of Electrical energy generated comes from

A. Thermal power stations
B. Hydro-electric power stations
C. Atomic power stations
D. Solar power stations

12. Which of the following is not a non-conventional energy source?

A. OTEC
B. Solar energy
C. Wind energy
D. Fossil fuels

13. A 6 pole synchronous motor connected to 50 Hz AC supply will run at

A. 1500 rpm
B. 1000 rpm
C. 750 rpm
D. 960 rpm

14. A 4 pole induction motor runs on 50 Hz AC supply with 4 % slip. Then the actual speed of the motor is

A. 1490 rpm
B. 1500 rpm
C. 1520 rpm
D. 1440 rpm

15. Capacitance of a Capacitor is directly proportional to

A. Area of the plates
B. Distance between the plates
C. Both A and B
D. None of the above

16. The Inductive reactance of an Inductor of 0.01 H when connected to 50 Hz AC supply will be

A. 6.28 Ω
B. 3.14 Ω
C. 31.4 Ω
D. 0.314 Ω

17. $\int 3x^2 =$

A. $3x^4$ B. $\frac{1}{3}x^3$

C. $2x^2$ D. x^3

18. Transformer works on the principle of

A. Self induction B. Dynamic induction

C. Mutual induction D None of the above

19. Which of the following is true in the case of Core loss of a Transformer?

A. Increases with increase in load current B. Decreases with increase in load current

C. Does not depend on load current D. Does not depend on frequency

20. An inverter circuit converts

A. AC voltage to DC voltage B. DC voltage to AC voltage

C. High voltage DC to low voltage DC D. Low frequency AC to high frequency AC

21. Which of the following transistor configuration has the maximum power gain?

A. Common Collector configuration B. Common Emitter configuration

C. Common base configuration D. All the configurations have equal gain

22. Short circuit test of a transformer is conducted to determine

A. Core loss B. Voltage regulation

C. No load Copper loss D. Full load Copper loss

23. Transformation ratio, 'K' of a transformer is equal to

A. V_2/V_1 B. N_2/N_1

C. I_1/I_2 D. All of the above

24. The resistance of the primary winding of a transformer is 2 Ω and the transformation ratio, K = 5. The equivalent resistance of the primary as referred to secondary is

A. 10 Ω B. 25 Ω

C. 50 Ω D. 2.5 Ω

25. What will be the impedance of a series circuit having R = 2.5 Ω and L = 0.01 H when connected to 50 Hz AC supply?

A. 4 Ω
B. 40 Ω
C. 250 Ω
D. 0.025 Ω

26. Eddy current loss in a transformer is proportional to

A. Square of the load current
B. Frequency
C. Square of the frequency
D. Load current and frequency

27. A transformer has 120 turns on the primary side and 2400 turns on the secondary side. If the primary voltage is 30 V, what will be the voltage at the secondary side?

A. 240 V
B. 600 V
C. 360 V
D. 120 V

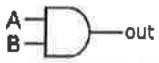
28. The solution for the quadratic equation $x^2 + 4x - 21 = 0$ is

A. x = -7, 3
B. x = 7, 3
C. x = 7, -3
D. x = -7, -3

29. Ocean covers approximately ____% of Earth's surface

A. 58
B. 82
C. 65
D. 71

30. For the logic gate given below, when A = 0 and B = 1, out will be



A. 0
B. 1
C. -1
D. None of the above

31. Three 6 Ω resistors are connected parallel. The equivalent resistance of the combination will be

A. 18 Ω
B. 3 Ω
C. 2 Ω
D. 6 Ω

32. The SI unit of electric charge is

A. Ampere
B. Joule
C. Farad
D. Coulomb

33. For a 3 phase circuit, V_L = 415 V, I_L = 10 A and Pf = 0.8. Then the active power drawn by the circuit will be

A. 5.75 kW
B. 3.32 kW
C. 518.8 W
D. 8.985 kW

34. Which of the following is a current controlled device?

A. IGBT
B. MOSFET
C. JFET
D. BJT

35. The RMS value of a sinusoidal AC voltage is 230 V. Then the peak value is

A. 398 V
B. 325 V
C. 115 V
D. 460 V

36. The Form factor of a sinusoidal AC voltage is

A. 1.414
B. 1.732
C. 1.11
D. 3.14

37. The relation between θe (Electrical angle) and θm (Mechanical angle) is

A. $\theta e = \frac{P}{2} \times \theta m$
B. θe = P x θm
C. θe = θm
D. θe = π x θm

38. Which of the following requires a center-tapped transformer?

A. Half wave rectifier
B. Full wave rectifier
C. Full wave bridge rectifier
D. All of the above

39. Transformer core is made of laminations to reduce

A. Copper loss
B. Hysteresis loss
C. Friction and windage loss
D. Eddy current loss

40. In a Lead-acid cell, the electrolyte used is

A. Dilute Hydrochloric acid
B. Dilute Sulphuric acid
C. Potassium hydroxide
D. Dilute Nitric acid

41. The relation between Line voltage and Phase voltage in a 3 phase star connected system is

A. Line voltage = Phase voltage
B. Line voltage = $\frac{Phase\ voltage}{\sqrt{3}}$
C. Line voltage = $\sqrt{2}$ x Phase voltage
D. Line voltage = $\sqrt{3}$ x Phase voltage

42. Corona discharge produces _____ gas

A. Ozone
B. Acetylene
C. Chlorine
D. Hydrogen

43. The starting current of an Induction motor with Star-Delta starter will be ____ times compared to starting current with DOL starter

A. $\frac{1}{2}$
B. $\frac{1}{3}$
C. $\frac{1}{\sqrt{3}}$
D. 3

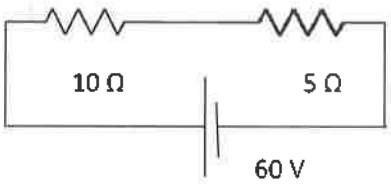
44. Indian Tsunami early warning center is located at

A. NIOT, Chennai
B. NCAOR, Goa
C. INCOIS, Hyderabad
D. IMD, Delhi

45. The resonant frequency of a LC series circuit having L= 10 mH and C= 1 μF is

A. 159.2 Hz
B. 1592 Hz
C. 1.592 Hz
D. 15.92 Hz

46. The voltage across the 10 Ω resistor in the circuit given below is



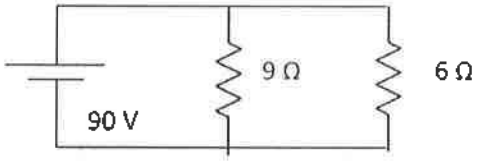
A. 20 V

B. 30 V

C. 45 V

D. 40 V

47. The current through the 6 Ω resistor in the circuit given below is



A. 4 A

B. 6 A

C. 15 A

D. 10 A

48. The heat produced by a heating element of resistance 15 Ω when connected across 240 V, 50 Hz supply for 1 minute is equal to

A. 230.4 kJ

B. 3.6 kJ

C. 225 kJ

D. 360 kJ

49. When two AC Generators, 'A' and 'B' are running in parallel and sharing the load, if the prime mover input of A is slightly increased, what will happen?

A. Load on 'B' will increase

B. Load on 'A' will increase

C. Frequency of the grid will increase

D. 'A' will lose synchronization

50. Magnitude of the induced EMF is proportional to the rate of change of flux linkage. This is known as

A. Faraday's first law of Electro-magnetic induction

B. Joule's law

C. Coulomb's law

D. Faraday's second law of Electro-magnetic induction

Answer key for PSA (Electrical) - Version A

Q. No	Ans	Q. No	Ans	Q. No	Ans	Q. No	Ans	Q. No	Ans
1	B	11	A	21	B	31	C	41	D
2	C	12	D	22	D	32	D	42	A
3	A	13	B	23	D	33	A	43	B
4	C	14	D	24	C	34	D	44	C
5	D	15	A	25	A	35	B	45	B
6	B	16	B	26	C	36	C	46	D
7	A	17	D	27	B	37	A	47	C
8	B	18	C	28	A	38	B	48	A
9	D	19	C	29	D	39	D	49	B
10	C	20	A	30	A	40	B	50	D