WB Police Wireless Operator

Previous Year Paper

Mains 2022

WBP Wireless Operator Main Question Paper

WOPR(FCE)-2020

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO

QUESTION BOOKLET

Time allotted : 1:30 Hours

Full marks : 85

PART – I (Physics & Mathematics) : 70 marks

PART – II (Language Test) : 15 marks

Question Booklet Serial No.

INSTRUCTIONS

1. This Question Booklet in two parts (Part - I & II) consists of 12 pages including this front page. Verify the page number of the Question Booklet on each page. If there is any discrepancy, bring it to the notice of the Invigilator. This Booklet contains questions only in English language.
2. **Part - I** of this Question Booklet contains **70** questions on Physics & Mathematics carrying equal mark each and **Part - II** has **01** question for Translation (Language Test).
3. Answers for **Part -I** will have to be given in the Special Answer Sheets (OMR Answer Sheets), supplied for the purpose, which consists of two pages. **Do not tear or separate any page of the OMR Answer Sheet. There will be a separate Answer Book for Part - II i.e. Translation (Language Test).**
4. Before you proceed to mark on the OMR Answer Sheet meant for **Part - I** in response to various items in the Question Booklet, you have to fill in some particulars in the OMR Answer Sheet. You must also write the Question Booklet No. on the Attendance Roll. **Do not fold the OMR Answer Sheet as this will result in error in your marks.** Candidates should write their Names, Final Competitive Examination Roll No. in the space provided in the title page on the Answer Book of **Part - II.**
5. All questions of **Part - I** will have *four* probable answers **(A)**, **(B)**, **(C)** and **(D)**. Find out which of the four answers appears to you to be correct or the best. Now darken the circle corresponding to the letter of the selected answer in the OMR Answer Sheet with **Black Ball Point Pen** issued by WBPRB only as per instructions sent along with the Admit Card and the OMR Answer Sheet. The same black ball point pen will have to be used for answering the translation (Language Test) in the Answer Book of **Part - II.**
6. If more than one circle is encoded for a particular answer in OMR Answer Sheet of **Part - I,** it will be treated as an incorrect response.
7. **¼th of the allotted marks (i.e. 0.25) will be deducted for each incorrect answer of MCQ type question in Part - I.**
8. There are blank pages at the end of the Question Booklet for Rough Work.
9. **The OMR Answer Sheet of Part - I (both pages intact) and Answer Book for Part - II of language test should be handed over to the Invigilator before leaving the Examination Hall. Candidates are then permitted to leave the hall with the Question Booklet. The Special Answer Sheet (OMR) of Part - I and the Answer Book for Part - II of language test is the property of the West Bengal Police Recruitment Board and must be returned to the Invigilator. Leaving the hall with the original or carbonless copy of OMR Answer Sheet of Part - I and the Answer Book for Part - II will result in penal or administrative action.**

PART – I

(Physics and Mathematics)

1. In vacuum, out of frequency, wavelength and amplitude, the speed of light depends upon

(A) amplitude
(B) frequency
(C) None of these
(D) wavelength

2. At absolute zero temperature, the element silicon acts as

(A) insulator
(B) non-metal
(C) superconductor
(D) metal

3. Character enhancements in Word Processing does not include

(A) Italics
(B) Underline
(C) Mail Merge
(D) Bold face

4. Formulas in a Spreadsheet must begin with which of the following sign?

(A) #
(B) $
(C) =
(D) @

5. The value of $2^{\log_3 5} - 5^{\log_3 2}$ is

(A) 5
(B) 0
(C) 2
(D) 3

6. Sky waves are reflected back to the earth's surface from the ionosphere due to the phenomenon of

(A) diffraction
(B) absorbtion
(C) total internal reflection
(D) refraction

7. An a.c. voltage of 50 V is applied to a series LCR circuit. If the voltage across resistor is 30 V and across the capacitor is 40 V, the voltage across inductor is

(A) 20 V
(B) 40 V
(C) 100 V
(D) 80 V

8. The area of circle centred at (1, 2) and passing through (4, 6) is

(A) 25π
(B) 5π
(C) 50π
(D) 10π

9. Two unequally charged balls attract each other with certain force. If they are allowed to touch and then separated to the same distance, the two balls will

(A) repel with smaller force.
(B) attract with smaller force.
(C) repel with greater force.
(D) attract with greater force.

10. The power factor of a choke coil at a frequency of 50 Hz is 0·707. If the frequency is doubled, then value of power factor will be

(A) $\frac{1}{3}$
(B) $\frac{1}{5}$
(C) $\frac{1}{\sqrt{3}}$
(D) $\frac{1}{\sqrt{5}}$

11. Sum of three terms of an A.P. is 33 and their product is 792. The least of them is

(A) 18
(B) 7
(C) 4
(D) 11

12. The impurity atom with which pure silicon should be doped to make an *n*-type semiconductor is

(A) Gallium
(B) Phosphorus
(C) Indium
(D) Boron

13. A body of mass 2 kg is placed on a horizontal surface having coefficient of kinetic friction 0·4 and coefficient of static friction 0·5. If a horizontal force of 2·5 N is applied on the body, the frictional force acting on the body will be

(A) 20 N
(B) 8 N
(C) 2·5 N
(D) 10 N

14. The centroid of a triangle is (2, 3) and two of its vertices are (5, 6) and (–1, 4). The third vertex of the triangle is

(A) (1, 2)
(B) (2, 1)
(C) (1, –2)
(D) (2, –1)

15. Two wires *A* and *B* of equal masses and of the same metal are taken. The diameter of the wire *A* is half the diameter of the wire *B*. If the resistance of the wire *A* is 24Ω, then the resistance of wire *B* will be

(A) 1·5Ω
(B) 12Ω
(C) 6Ω
(D) 3Ω

16. A simple wave motion is represented by $5\left(\sin 4\pi t + \sqrt{3}\cos 4\pi t\right)$. Its amplitude is

(A) $10\sqrt{3}$
(B) 5
(C) 10
(D) $5\sqrt{3}$

17. The energy required to accelerate a car from speed of 10 m/s to 20 m/s is how many times than the energy required to accelerate the car from rest to speed of 10 m/s?

(A) 2 times
(B) equal
(C) 3 times
(D) 4 times

18. When light is refracted, _____ of light does not change.

(A) frequency
(B) velocity
(C) wavelength
(D) amplitude

19. The slope of displacement–time graph indicates

(A) velocity of the body.
(B) acceleration of the body.
(C) distance covered by the body.
(D) speed of the body.

20. The electric and magnetic field of an em-wave are

(A) in opposite phase and perpendicular to each other.
(B) in phase and perpendicular to each other.
(C) in opposite phase and parallel to each other.
(D) in phase and parallel to each other.

21. The reverse saturation current in a junction diode

(A) decreases with increase in temperature.
(B) does not depend on temperature.
(C) increases with decrease in temperature.
(D) increases with increase in temperature.

22. A set contains n elements. The corresponding power set contains

(A) n^2 elements
(B) n elements
(C) $2n$ elements
(D) 2^n elements

23. Which of the following refers to the vertical or horizontal placement of a graphic in relation to the chosen anchor point?

(A) Margin
(B) Alignment
(C) Headings
(D) Footer

24. The numerical ratio of displacement to distance is

(A) always more than one.
(B) always less than one.
(C) equal to or less than one.
(D) always equal to one.

25. Kirchhoff's first law ($\sum i = 0$), where symbols have their usual meanings, is based on the law of conservation of

(A) momentum
(B) charge
(C) mass
(D) energy

26. Centre of the circle $4x^2 + 4y^2 - 10x + 5y = 0$ is

(A) $\left(\frac{5}{4}, -\frac{5}{8}\right)$
(B) $\left(5, \frac{5}{2}\right)$
(C) $\left(5, -\frac{5}{2}\right)$
(D) $\left(-\frac{5}{4}, \frac{5}{8}\right)$

27. The input and output signals of CE amplifier are

(A) differ in phase by 180°.
(B) always equal.
(C) differ in phase by 90°.
(D) always in phase.

28. Fuse wire is a wire of

(A) high resistance and low melting point.
(B) low resistance and high melting point.
(C) low resistance and low melting point.
(D) high resistance and high melting point.

29. When NPN transistor is used as an amplifier

(A) electrons move from collector to base.
(B) electrons move from base to collector.
(C) holes move from base to emitter.
(D) holes move from emitter to base.

30. The maximum power delivered by a battery of emf ε and internal resistance r to an external circuit is

(A) $\frac{\varepsilon^2}{2r}$
(B) $\frac{\varepsilon^2}{8r}$
(C) $\frac{\varepsilon^2}{4r}$
(D) $\frac{\varepsilon^2}{r}$

31. If $y = \tan^{-1}\left(\frac{\cos x + \sin x}{\cos x - \sin x}\right)$, then $\frac{dy}{dx} = ?$

(A) -1
(B) 0
(C) $\sec^2 x$
(D) 1

32. The angles of a triangle are in A. P. and the least angle is 30 degrees. The greatest angle in radians is

(A) $\frac{5\pi}{6}$
(B) $\frac{7\pi}{12}$
(C) $\frac{\pi}{2}$
(D) $\frac{2\pi}{3}$

33. The power factor of series LCR circuit at resonance is

(A) 1·0
(B) zero
(C) Depends on the value of R
(D) 0·5

34. Which document view gives an appearance as in the web browser?

(A) Web layout view
(B) Draft view
(C) Full screen reading
(D) Outline view

35. If two bulbs of wattages 25 and 100 respectively each rated at 220 V are connected in series across 440 V supply, which bulb will fuse?

(A) None of (B) and (D)
(B) 100 W
(C) Both of (B) and (D)
(D) 25 W

36. A particle is projected vertically upward. It attains a height h after 2 seconds and again after 10 seconds. The speed of the particle at height h is, equal to (g denotes acceleration due to gravity)

(A) $4g$
(B) g
(C) $6g$
(D) $2g$

37. The moment of momentum is called

(A) impulse
(B) couple
(C) angular momentum
(D) torque

38. A resistance of 10Ω and a coil of 100 mH are connected across an a.c. source $v = 100 \sin 100t$. The maximum current in the coil is

(A) $5\sqrt{2}$ A
(B) 10 A
(C) $10\sqrt{2}$ A
(D) 5 A

39. If $y = \log_e x^x$, then $\frac{dy}{dx} = ?$

(A) $\log_e(ex)$
(B) 1
(C) x^{-x}
(D) $\log_e x$

40. A body is moved in straight line by constant power of machine. What will be the relation between the travelling distance (s) and time (t)?

(A) $s^3 \propto t^2$
(B) $s^2 \propto t^3$
(C) $s \propto t^3$
(D) $s^2 \propto t$

41. $\int \frac{\log_e(\log_e x)}{x \log_e x}\, dx = ?$

(A) $\log_e(\log_e x) + C$

(B) $\left[\log_e(\log_e x)\right]^2 + C$

(C) $\frac{1}{x \log_e x} + C$

(D) $\frac{1}{2}\left[\log_e(\log_e x)\right]^2 + C$

42. A piece of copper and another of germanium are cooled from room temperature to 77K. The resistance of

(A) copper increases and of germanium decreases.

(B) each of them increases.

(C) copper decreases and of germanium increases.

(D) each of them decreases.

43. The relative permittivity of water is 81. If ε_0 and ε_w are permittivities of vacuum and water respectively, then

(A) $\varepsilon_w = 9\varepsilon_0$

(B) $\varepsilon_0 = 9\varepsilon_w$

(C) $\varepsilon_w = 81\varepsilon_0$

(D) $\varepsilon_0 = 81\varepsilon_w$

44. The points A(12, 8), B(–2, 6) and C(6, 0) are the vertices of

(A) equilateral triangle.

(B) right angled triangle.

(C) points A, B and C lie on straight line.

(D) scalene triangle.

45. A choke coil is a coil with a

(A) high inductance and high resistance.

(B) low inductance and high resistance.

(C) high inductance and low resistance.

(D) low inductance and low resistance.

46. The moment of inertia of a body does not depend upon

(A) the distribution of mass in the body.

(B) the angular velocity of the body.

(C) the axis of rotation of the body.

(D) the mass of the body.

47. NPN transistors are preferred to PNP transistors because they have

(A) high mobility of electrons.

(B) low cost.

(C) capability to handle large power.

(D) low dissipation of energy.

48. If $x^a = y$, $y^b = z$, $z^c = x$, then abc = ?

(A) 1

(B) xyz

(C) $\log xyz$

(D) 2

49. Zener breakdown in a semiconductor diode occurs when

(A) forward bias exceeds a certain value.

(B) forward current exceeds a certain value.

(C) potential barrier is reduced to zero.

(D) reverse bias exceeds a certain value.

50. An electric field can deflect

(A) α-particles

(B) X-rays

(C) γ-rays

(D) neutrons

51. $\lim_{x \to 0} \frac{\left[(2+x)\sin(2+x) - 2\sin 2\right]}{x} = ?$

(A) 1

(B) $\sin 2$

(C) $2\cos 2 + \sin 2$

(D) $\cos 2$

52. The value of $\sin^6\theta+\cos^6\theta+3\sin^2\theta\cdot\cos^2\theta$ is

(A) 2
(B) 0
(C) 3
(D) 1

53. For a given velocity, a projectile has the same range R for two angles of projection. If t_1 and t_2 are the time of flight in the two cases, then

(A) $t_1t_2 \propto \frac{1}{R^2}$
(B) $t_1t_2 \propto R$
(C) $t_1t_2 \propto \frac{1}{R}$
(D) $t_1t_2 \propto R^2$

54. The third term of a G.P. is 4. The product of the first five terms is

(A) 4^5
(B) 4^3
(C) 4
(D) 4^4

55. The Hertz is a unit of

(A) electric field
(B) energy
(C) frequency
(D) magnetic permeability

56. GUI is used as an interface between

(A) software and memory
(B) hardware and software
(C) hardware and user
(D) hardware and memory

57. An electronic oscillator is nothing but an amplifier

(A) with a modulator
(B) with feedback
(C) with detector
(D) without feedback

58. How much work must be done by a force on 50 kg body in order to accelerate it from rest to 20 m/s in 10 s?

(A) 2×10^3 J
(B) 10^3 J
(C) 5×10^4 J
(D) 10^4 J

59. The Boolean expression $Y=\bar{A}B+A\bar{B}$ represents a/an

(A) AND gate
(B) NOR gate
(C) XOR gate
(D) NAND gate

60. Choose the appropriate material to be used in the conductor of resistance boxes out of the following:

(A) Manganin
(B) Copper
(C) Aluminium
(D) Iron

61. A body of mass m moving with a constant velocity v hits another body of same mass moving with the same velocity but in the opposite direction and sticks to it. The velocity of the compound body after collision is

(A) zero
(B) v
(C) $\frac{v}{2}$
(D) $2v$

62. Two equal resistors connected in series across a source of emf together dissipate 10 W of power. What will be the power dissipated if the same resistors are connected in parallel across the same source of emf?

(A) 90 W
(B) 10 W
(C) $\frac{10}{3}$ W
(D) 30 W

63. If a body is moving in a circle of radius r meter with a constant speed v m/s, its angular velocity will be

(A) $\frac{v}{r}$

(B) $\frac{v^2}{r}$

(C) $\frac{r}{v}$

(D) $v.r$

64. In communication system, repeaters are used to

(A) increase the range of the system.

(B) increase the efficiency of system.

(C) reduce attenuation of transmitted signals.

(D) reduce the distortion in transmitted signals.

65. Which of the following is a device that converts digital computer signals into analog signals that can travel over phone lines and vice versa?

(A) Router

(B) Repeater

(C) Modem

(D) Switch

66. A kite is flying at an inclination of 60° with the horizontal plane. If the length of the thread is 120 m, then the height of the kite is

(A) $\frac{60}{\sqrt{3}}$ m

(B) $60\sqrt{3}$ m

(C) 120 m

(D) 60 m

67. In a transistor, out of the base, collector and emitter, which is most lightly doped?

(A) Emitter

(B) Base

(C) All are equally doped

(D) Collector

68. If at any time the displacement of simple pendulum is 0·02 m and acceleration is 2 m/s^2, then at this time angular velocity will be

(A) 1 rad/s

(B) 100 rad/s

(C) 0·1 rad/s

(D) 10 rad/s

69. The time period of a mass suspended from a spring is T. If the spring is cut into four equal parts and the same mass is suspended from one of the parts, then the new time period will be

(A) T

(B) $2T$

(C) $\frac{T}{2}$

(D) $\frac{T}{4}$

70. If α and β are the roots of the quadratic equation $4x^2 + 3x + 7 = 0$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is

(A) $\frac{3}{7}$

(B) $-\frac{3}{4}$

(C) $\frac{4}{7}$

(D) $-\frac{3}{7}$

PART – II
(Language Test)

Translate the following passage either in **Bengali** or in **Nepali** as chosen by you in the application form: 15

God is merciful father of entire world. He knows our strengths and weaknesses. Whenever we make mistakes, we must admit them. We must pray to God to forgive us. Forgiveness is a great virtue. It is not easy to forgive but God does it. This belief gives us immense confidence in God. Faith gives us the courage to face all kinds of problems. This helps to lead a happy, successful and useful life. Parents hope that their children will do well in examinations. Children hope that their parents will appreciate them and their achievements. Most people do not know what they want in life. They fail to achieve the success in work. It is necessary to set the target by everyone. A well-defined goal is half-achieved.