ST. JOSEPH’S SENIOR SECONDARY SCHOOL NAGGALAMA

 **S.3 MATHEMATICS PAPER 1**

 **TIME: 2 ½ HOUR2**

NAME ……………………………………………………………….. STREAM ……………

INDEX NUMBER: ………………………………………………………..

**INSTRUCTIONS:**

* Attempt all questions

**SECTION A (40 MARKS)**

1. Given that a $∆$ b = a + ab, find:
2. 2 $∆$ 2
3. t given that t $∆$ – 2 = 3 (04 mks)
4. Solve the equation $\frac{x-3}{5}$ = 4 – $\frac{x-2}{2}$ (04 mks)
5. Given matrices A = $\begin{matrix}4&8\\2&6\end{matrix}$ and B = $\begin{matrix}2&0\\0&2\end{matrix}$ find and determine BA (04 mks)
6. The figure below shows a pie – chart for the fruits sold in a certain supermarket.

 Apples

 1200

 Pineapples

 960 540

 Mangoes

 Bananas

If 420 pineapples were sold, determine:

1. The total number of fruits sold
2. The number of Bananas sold (04 mks)
3. Solve the following simultaneous equation

5*x* + 3y = 7

2*x* – 4y = 3 (04 mks)

1. Given that sinθ = $\frac{3}{5}$ for 900 < θ < 1800. Find the value of cosθ – tanθ (04 mks)
2. Make m the subject in the expression n = 2*x* $\sqrt{\frac{3}{m - 4 }}$ (04 mks)
3. Factorise 3*x*2 – 7*x* + 4 hence solve the equation 3*x*2 – 7*x* + 4 = 0 (04 mks)
4. The bearing of point A from B is 0400.
5. Find the bearing of B from A
6. If A and B are 40km apart and on the scale diagram its 8cm. What scale is used?

 (04 mks)

1. Find the image of point P(4 , –1 ) after a reflection through the line y = *x* (04 mks)

**SECTION B (60 MARKS)**

1. (a) Copy and complete the table for y = (2*x* – 3) ( 4 + *x*)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *x* | –5 | –4 | –3 | –2 | –1 | 0 | 1 | 2 | 3 |
| 2 *x* – 3 |  |  |  |  |  |  |  |  |  |
| 4 + *x* |  |  |  |  |  |  |  |  |  |
| y |  |  |  |  |  |  |  |  |  |

(b) Draw a graph of y = (2*x* – 3) (4 + *x*)

(c) Use your graph to solve

 (i) 2*x*2 + 5*x* – 12 = 0

 (ii) 2*x*2 – 7*x* + 5 = 0 (12 mks)

1. Triangle ABC with vertices; A(2 , 1) B(4, 4) and C(2,3) is reflected through the *x* – axis to get A B C. Triangle A B C is the rotated about the origin through a negative quarter turn to get A B C.
2. By construction, draw the three triangles on the same graph paper
3. Write down the co-ordinates of A B C and A B C
4. Find the transformation matrix that maps ABC direct to A B C (12 mks)
5. The table below shows marks scored in a math test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Marks | 20 – 29 | 30 - 39 | 40 – 49 | 50 – 59 | 60 – 69 | 70 – 79 |
| Cumulative Frequency | 5 | 12 | 20 | 35 | 38 | 40 |

1. State:
2. The class width
3. The modal frequency
4. Calculate:
5. The mean
6. The mode
7. Draw a cumulative frequency curve and use it to estimate the median (12 mks)
8. (a) Using a rule, pencil and pair of compasses only construct a triangle PQR such that PQ -= 8.7cm, PR = 10.6cm and angle QPR = 600.

 (b) Construct a circumcircle to the triangle, measure and record its radius

1. Construct a perpendicular from Q to PR to meet PR at point E. Measure and record the length of QE . (12 mks)
2. (a) Given matrices A = $\begin{matrix}2&1\\3&-1\\4&3\end{matrix}$ and B $\begin{matrix}-4&2&1\\1&3&2\end{matrix}$

 Find matrix C = BA

(b) In a league the best four teams were Liverpool, Man U, Chelsea and Arsenal. The following letters W, D and L were representing a win, a draw and a loss respectively. 3 points were awarded for a win, 1 point for a draw and zero for a loss.

Using the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Team** | **W** | **D** | **L** |
| Man U | 2 | 5 | 3 |
| Liverpool | 5 | 4 | 1 |
| Chelsea | 3 | 6 | 1 |
| Arsenal | 4 | 3 | 3 |

1. Write down a 3 x 4 matrix for the games played and a 1 x 3 matrix for points.
2. Using the matrix multiplication, find the number of points obtained by each team hence state the winner of the tournament. (12 mks)

ST. JOSEPH’S SENIOR SECONDARY SCHOOL NAGGALAMA

 **S.3 PHYSICS PAPER 1**

 **535/1**

 **TIME: 2 HOURS 15 MINUTES**

NAME ……………………………………………………………….. STREAM ……………

INDEX NUMBER: ………………………………………………………..

**INSTRUCTIONS**

* Attempt all numbers in both sections
* Answers to section A should be put in the table below and answers for section B must be written in the spaces provided.
* The following constant may be used
* Acceleration due to gravity g = 10 m/s2
* Density of water = 1000kgm–3
* Speed of sound in air = 320ms–1
* Speed of light in a vacuum = 3 x 108 m/s.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. |  | 11. |  | 21. |  | 31. |  |
| 2. |  | 12. |  | 22. |  | 32. |  |
| 3. |  | 13. |  | 23. |  | 33. |  |
| 4. |  | 14. |  | 24. |  | 34. |  |
| 5. |  | 15. |  | 25. |  | 35. |  |
| 6. |  | 16. |  | 26. |  | 36. |  |
| 7. |  | 17. |  | 27. |  | 37. |  |
| 8. |  | 18. |  | 28. |  | 38. |  |
| 9. |  | 19. |  | 29. |  | 39. |  |
| 10. |  | 20 |  | 30. |  | 40 |  |

1. The process by which heavy nuclei split into lighter nuclei is called;
2. Fusion B. Fission C. Ionisation D. Radioactivity
3. The pitch of a note from a guitar string can be made higher by:
4. Lengthening the string C. Tightening the string
5. Heating the string D. Increasing the thickness of the string
6. Tungsten is used as the anode in the X-ray tube because;
7. It conducts electricity easily C. It does not melt easily
8. It produces X – ray easily D. It is easily available.

1. An object of mass of 2kg moving at 5ms–1 collides with another object of mass 3kg which is at rest. Find the velocity of the two bodies if they stick together after collision.
2. 1.0ms–1 B. 2.0 ms–1 C. 2.5 ms–1 D. 5.0 ms–1
3. Total internal reflection occurs when;
4. Light travels from a dense to less dense medium
5. Incident angle is equal to critical angle
6. Light travels from a less dense to a more dense medium
7. Critical angle in a dense medium is greater than angle of incident.
8. Which of the following does not change when water waves travel from deep to shallow water?
9. A frequency B. Amplitude C. Velocity D. Wave length.
10. Calculate the effort, when a load of 72N is raised using a block system of five pulleys and efficiency 80%
11. 11.5N B. 18N C. 57.6N D. 288N
12. For a person who is short – sighted, the rays of light from;
13. Distant objects are focused in front of the retina
14. Near objects are focused behind the retina
15. Distant objects are focused behind the retina
16. Near objects are focused in front of the retina.
17. Water waves are produced at a frequency of 5HZ – The distance between 10 successive crest is 18cm. Calculate the velocity of waves in ms–1
18. 9 B. 0.1 C. 0.09 D. 1
19. A notch on a brittle material spreads more rapidly when the material is
20. In tension C. In compression
21. Pre-stressed D. Reinforced
22. A tank 2m tall and bass are 2.5m2
23. is filled to the bottom with a liquid which exerts a force of 40,000N at the bottom. Calculate the density of the liquid.
24. 40000 Kg m–3 C. 40,000 Kgm–3

 2.5 x 2 x 10 25 x 2 x 10

1. 40,000 Kgm–3 D. 40, 000 Kgm–3

2.5 x 2 x 10 2.5 x 2

1. The secondary colours of light are cyan, magenta and yellow. Which of the following set of additional of colours of light will produce white light?
2. Cyan + blue and magenta + red C. Cyan + red and magenta + green
3. Yellow + red and yellow + blue D. Cyan + green and yellow + blue.
4. Which of the following statements are true?
5. Surface which is white reflects all colours of light appears white
6. Red surface absorb all colours and reflects only red light
7. Black surface appears black because they reflect all colours
8. (i) only B. (i) and (ii) only C. (iii) only D. (ii) and (iii) only
9. 228Th A + alpha particles. The above equation represents an activity in which

 90 Z

 Thorium decays and emits an alpha particle. Find the value of Z.

1. 88 B. 89 C. 91 D.92
2. Which of the following statements is not true about magnet?
3. Magnetic poles cannot be separated
4. A paramagnetic material is a material from which strong magnetic can be made
5. The neutral point in a magnetic field is a point where there is no force experienced
6. Heating a magnet can reduce its magnetism
7. When water spreads on glass it is due to;
8. Capillarity B. Adhesion C. Cohesion D. Surface tension
9. An atom contains 3 electrons and 4 neutrons. Its nuclear number is
10. 10 B. 7 C. 4 D. 3
11. Points on a standing wave with maximum displacement are called
12. Nodes B. Troughs C. Crests D. Antinode
13. The count-rate of radioactive substance falls from a count-rate of 600h–1 to a count – rate of 75h–1 in 75 hours. The half – life of the radioactive substance is;
14. 25hours B. 19 hours C. 75 hours D. 6 hours
15. 10cm Hg B. 76cm Hg C. 66cm Hg D. 142 cm Hg
16. The volume of an oil drop is 1 x 10–5 cm3. If it forms a patch of area 2 x 102cm2, the size of one molecule in an oil drop is
17. 5 x 10–8 cm B. 2 x 10–3 cm C. 5 x 10–6 cm D. 2 x 10–5 cm
18. Which of the following diagrams describe how circular wave fronts are reflected from a concave reflector.
19. B

 C. D.

1. In a cathode ray oscilloscope, the deflecting system consists of:
2. X and Y plates C. The anodes and cathode
3. Grid and the heater D. The Y – plates and anodes
4. Charge distribution on a conductor depends on,
5. Material out of which the conduct is made C. Nature of charge
6. Quantity of charge D. Shape of the conductor
7. The particles of the medium through which a longitudinal wave travels;
8. Vibrate parallel to the direction of wave propagation
9. Move along with the wave
10. Move in the opposite direction to that of the wave
11. Vibrate perpendicular to the direction of wave propagation.
12. A joule is defined as the;
13. Unit of energy
14. Work done to move 1 kg mass through 1m
15. Force which gives a mass of 1 kg an acceleration of 1ms–2
16. Work done when a 1N force moves a body through 1m.
17. The fundamental interval of a thermometer is 16.8cm. If the length of the mercury thread is 8.4 above the ice point, calculate the temperature shown.
18. 84.60C B. 50.00C C. 25.20C D. 30.80C
19. Which of the following is a set of only scalars?
20. Velocity, mass, displacement and pressure
21. Acceleration , mass power and time
22. Mass, length, time and pressure
23. Work, power, momentum and pressure.
24. A vibrator of frequency 20HZ produces waves of velocity 2ms–1. Find the period of the waves,
25. 1.0 x 10–1S C. 5.0 x 10–1S
26. 5.0 x 10–2S D. 1. 0 x 10–1S
27. Which of the following distance – time graphs shows a body at rest?

 A

 D(m) D(m) D(m) D(m)

 t(s) t(s) t(s) t(s)

1. A cylindrical metal of radius 7m is placed on a table with its circular face in contact with the table surface. If its weight is 616N. Calculate the pressure it exerts on the table.
2. 4 x 100 Nm–2 C. 4 x 101 Nm–2
3. 4 x 101 Nm–2 D. 4 x 103 Nm–2
4. Which of the following images is a real image?
5. Image produced by a microscope C. image produced by a plane mirror
6. Image produced by a pin hole camera D. image produced by a convex mirror
7. Which of the following shows a piece of material in a magnetised condition?

A . C.

1. D.
2. A rod of cross sectional area 40cm2 requires a tensile force of 2N to break it. What is its breaking stress?
3. 0.005 Nm–2  C. 5.00 Nm–2
4. 0.05 Nm–2  D. 500 Nm–2
5. When a charged body is brought near a cap of negatively charged gold leaf electroscope; the
6. Divergence of the leaf doesn’t change
7. Leaf falls if the body is negatively charged
8. Leaf diverges if the body is positively charged
9. Leaf diverges if the body is negatively charged
10. Which of the following represents the appearance on the screen of a C.R.O when a d.c voltage is connected across the Y plates and the time base is switched on?
11. B. C. D.
12. A train pulls a trailer of mass 2000kg moving at a speed of 40ms–1 along a level road. If the tension in the string is 1000N, what power does the engine use?
13. 1.0 x 103 W B. 2.0 x 103 W C. 3. 0 x 104 W D. 4.0 x 104 W
14. When reflection occurs in a plane mirror,
15. The image is real, erect and magnified
16. The angle of reflection is equal to the angle of incidence.
17. The glancing angle must be equal to the angle of reflection
18. The incident ray and reflected rays lie in opposite planes.
19. A stone is thrown vertically upwards with a velocity of 100ms–1. What is the maximum weight attained?
20. 500m B. 400m C. 300m D. 200m
21. This is an example of a non – renewable source of energy
22. Charcoal B. Hot springs C. Tides D. Wind

**SECTION B**

1. (a) Mention any two properties of images formed by a convex mirror. (02 mks)
2. ……………………………………………………………………………………..
3. ……………………………………………………………………………………...

(b) Complete the diagram below for reflection using a convex mirror. (02 mks)

1. F
2. (a) Define the term pressure. (01 mk)

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(b) Mention the factors upon which pressure in fluids depends. (01 mk)

1. ……………………………………………………………………………………..
2. ……………………………………………………………………………………...

(c) Calculate the pressure exerted by a liquid of density 800kgm–3 on an object at the

 bottom of the liquid if the depth of the liquid is 250cm. (02 mks)

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1. (a) Define the terms below as applied to waves.
2. Wave length

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1. Amplitude

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(b) The graph below shows the wave motion of water.

 D(m)

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 225m

 Find the wave length (02 mks)

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1. (a) State the law of electrostatics (01 mk)

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(b) (i) The figure below shows a positively charged point and a [positively charged

 plate. Show the field lines. (02 mks)

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 +

 + +

 +

 +

 (ii) What is meant by electric field? (01 mk)

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1. (a) State two conditions necessary for a body to be in stable equilibrium. (02 mks)
2. ……………………………………………………………………………………..
3. ……………………………………………………………………………………...

(b) A uniform half metre rule is pivoted at the 10cm mark. A mass of 50g is hung at the

 5cm mark. Calculate the mass of the half metre rule. (02 mks)

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1. (a) What is radioactivity? (01 mk)

……………………………………………………………………………………………..

……………………………………………………………………………………………..

(b) 292 288  A 288 B

 90 88 89

1. The equation above shows radioactive decay with particles A and B. Identify

A: ………………………………………………………………………( 01 mk)

B: ……………………………………………………………………… (01 mk)

1. How many neutrons are in Z (01 mk)

……………………………………………………………………………………………..

……………………………………………………………………………………………..

1. (a) What is uniform acceleration? (01 mk)

……………………………………………………………………………………………..

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(b) A car of mass 2 tonnes moving at 22m/s is brought to rest in 10 seconds. Find:

 (i) The retardation rate (02 mks)

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 (ii) The braking force applied (01 mk)

……………………………………………………………………………………………..

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1. (a) Define the following terms:
2. Conduction (01 mk)

……………………………………………………………………………………………..

……………………………………………………………………………………………..

1. Convection (01 mk)

……………………………………………………………………………………………..

……………………………………………………………………………………………..

(b) Name the parts shown in the diagram below.

1. (a) What is a simple machine? (01 mk)

……………………………………………………………………………………………..

……………………………………………………………………………………………..

(b) A force of 200N is applied on a machine to lift a load of 500N through 6m. If the efficiency of the machine is 85%, find the distance moved by the effort. (03 mks)

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1. (a) List any two ways by which a magnet can lose its magnetism (02 mks)
2. ……………………………………………………………………………………..
3. ……………………………………………………………………………………...

(b) Briefly explain how consequent poles on a magnet may arise. (02 mks)

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